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THE

MEDICAL AND LEGAL RELATIONS

OF

MADNESS.

THE

MEDICAL AND LEGAL RELATIONS

OF

MADNESS;

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SHOWING A

CELLULAR THEORY OF MIND, AND OF NERVE FORCE,

AND ALSO OF

VEGETATIVE VITAL FORCE.

BY

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LONDON:

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PREFACE.

When madness became included within pathologlica laws, and the investigations concerning the conditions of the human mind,—which had been involved within the meshes of metaphysics,—came to be considered in connection with physiology, a new science was discovered; and the public sentiment, which is perhaps the most accurate measure of the importance of the subject, in its social relations, called for the amelioration and improvement of the condition of the lunatic, who had been hitherto considered a great sinner; and madness, was held to be scarcely a less stain upon the social character, than crime, witchcraft, or sorcery. The tide of civilization advanced, and the philanthropy and devotion of Howard to the amelioration of the criminal, reached the lunatic also at the same time, and probably often in the same place, and thus, the condition of the lunatic induced inquiry, and the importance of such inquiry as a social question, has become gradually and firmly established.

The position of the medical profession is not well sustained;

skill is more often treated as an impertinence, than appreciated, and the physician—whose ability is less scrutinized than the texture of his coat, or the colour of his hair and complexion, or the style of his equipage, is often considered a family appendage,—subject to likes, dislikes, and caprices. If his religion be of the right shade,—if he can play or sing the favorite air,—or if his connections possess influence, he may be esteemed, for such social conditions. The medical man is also surrounded by quackery, in luxurious and fascinating forms, which assumes the affectation of science on the one hand, and of mysticism on the other; or quackery holds up to scrutiny and censure, the weak points of medical practice, and by extolling the virtues of a *nonentity*, pretends to cure, by an opposite practice to the one it condemns, and thus thoroughly tests, and laughs at the credulity of mankind.

The speedily acquired dexterity of the quack gives him the advantage; since experience, art, and science are illimitable, and the labours of the man of study never terminate, but if his labours rarely afford him profit, they nevertheless give him enjoyment. *Ars longa—Vita brevis est.*

Thus the complaints that civil honours are not conferred upon the medical profession will continue, but problems of social improvement must be solved, for which the astuteness of the lawyer,—the learning of the divine,—and the labour of the statist, who have hitherto exclusively enjoyed state privileges and social position, may prove unavailable or obstructive; and the suggestions of the physio-

logist may be required to aid, or to supersede them, for the security, happiness, and progress of mankind.

The view in which so-called criminal madness presents itself, is forcibly adverted to in a leading article of the 'Times,' upon the trials of the two homicides, Corrigan and Westron, on February 8th last, and is quoted, as being especially relevant, since, in this instance, the lawyers had the question entirely in their own hands, and quite free and independent of medical interference, or of physiological testimony.

"In the case of Corrigan, the wretched man who murdered his wife in the Minories, the jury, on Wednesday, with little hesitation, returned a verdict of 'Guilty.' The plea of insanity was not admitted. Charles Westron, on the other hand, the clerk who shot Mr. Waugh last month in Bedford Row, has escaped under the same plea—that is to say, the jury found him guilty, but recommended him to mercy, on account of his strong predisposition to insanity. Under these circumstances, Mr. Justice Wightman, after consultation with Mr. Justice Willes, did not pass sentence of death upon the prisoner, but ordered judgment of death to be recorded. This is equivalent to the admission of the plea, and the prisoner will, no doubt, be detained for the remainder of his days in a madhouse. What is insanity? The subject defies definition; yet some sort of definition we must have. Here is what Justice Wightman told the jury in Corrigan's case: 'It is my duty to tell you that before you can come to the conclusion that the prisoner is not responsible on the ground of insanity, you must be satisfied that at the time the

act was committed the prisoner was labouring under such a defect of reason as not to know the nature and quality of the act he was committing.' This definition answered the purpose of convicting Corrigan; yet, in truth, we scarce see how a beastly sot, who had drunk himself into a state of frenzy, can exactly be said to have been aware 'of the nature and value of the act he was committing.' We do not quarrel with the conviction, for the man was rightly convicted, but with the definition of insanity. A man in a frenzy of passion, or in a fit of intoxication which turns to violence, cannot, with any propriety, be said to be of soundly judging mind. We will not pretend to substitute any definition of our own for that of the learned judge, nor have we ever seen in any work on forensic jurisprudence, or in the charge of any judge, any formal definition upon this point against which exception could not be taken. Fortunately for precision of judgment, no very nice question of sanity or non-sanity arose in Corrigan's case. It was simply that of an habitual drunkard, who, in a fit of frenzy and violence, superinduced by drink, killed his wife by stabbing her. There was no positive evidence to show that the man had ever laboured even under *delirium tremens*. Mrs. Elizabeth Fearon had heard that he had suffered from this disease. Mr. Cook, the medical witness in the case, who examined the unfortunate woman's body after death, in answer to questions from the cross-examining counsel, returned some very proper answers upon the nature and effects of the disease, but he did not state that the prisoner was affected

by *delirium tremens*. He knew nothing of his habits—he never saw him until the time of this transaction. The counsel for the defence, in the exercise of their discretion, would not, *or from ignorance of the symptoms* could not, put to him those questions which would have elicited the fact of whether or not he was labouring under an attack of this disease when seen by Mr. Cook. In this case the usual proceeding of producing mad-doctors was not resorted to—it was probably felt that the attempt would be useless, and Mr. Ballantine was driven to rely upon his own tact and skill for extracting a mitigated sentence from the jury. His endeavour was to show that the act had been committed under the influence of '*uncontrollable impulse*,' and could only be accounted for on the supposition that the prisoner was not in his right senses at the time the act was committed. This is just the old story, and we are happy to see that for once a plea was not available which might be pleaded in defence or in extenuation of any crime.

"The case of Westron was somewhat different, and no doubt there was sufficient evidence to show that there were symptoms of what medical men would call insanity existing in his case. The verdict of the jury is, however, equally an anomaly in criminal proceedings, and one which we fear will be of most evil precedent:—'We find the prisoner guilty of wilful murder; we do not think he ought to be acquitted on the ground of insanity, but we recommend him to mercy because, in his case, we find there were strong predispositions

to insanity.' In our opinion, nothing can be a greater mockery of all the solemnities of justice than the conclusion of this trial. The jury recommend the prisoner to mercy because they find, in his case, that which should have entitled him to an acquittal; but, notwithstanding, they find him guilty. The judge then, according to the time-honoured practice, causes sentence of death to be recorded against the prisoner, although it is a perfectly well understood matter that it is not to be carried into effect. Surely all this is absurd in the highest degree. As far as the jury are concerned, they should have either had the courage to acquit, or the firmness to condemn. As it is, here is an easy loophole of escape provided for the qualms and scruples of jurymen. They will not set the dictates of their consciences at defiance, they will not openly violate their oaths, they will satisfy justice by pronouncing a prisoner guilty, and by the next breath of their foreman relieve their minds and stultify their own conclusion. It is highly to be desired that this modern innovation should be nipped in the bud. By all means let the jury retain their privilege of recommending a prisoner to mercy, and let the judge, as in old times, second or oppose the recommendation. The opinion of the judge who tries the case is the best rule for the guidance of the Secretary of State, who has to consider the application for mercy. According to this new proceeding, the opinion of the judge literally counts for nothing. If the verdict of 'Guilty, but recommended to mercy on the ground of predisposition to insanity,' be interchangeable with 'Not Guilty,

on the ground of insanity,' the office of the judge is purely ministerial. Nothing remains for him but to cause the sentence of death to be recorded, and to hand over to the lunatic asylum a man who has just been found guilty of wilful murder and of sane mind at the time that murder was committed by his hand."

South Norwood;
November, 1857.

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MEDICAL AND LEGAL

RELATIONS OF MADNESS.

INTRODUCTION.

At different periods madness has been considered in different ways: in the New Testament the insane are supposed to be possessed of devils, and by the "casting out of devils" the lunatic became restored to reason;[1] the ancients considered the lunatic to be under the care and tutelage of the gods; and amongst some savage races in the South Sea Islands, who, by that inscrutable circuit which the history of mankind manifests, inherit this classical tradition, consider the insane objects of veneration, and worship them as inspired and superior beings, and confer upon them every privilege, freedom, and protection. Madness has been treated metaphysically in relation to mind and matter, and psychologically in respect to the existence and seat of the soul; but its physiological disturbances, and the diseases which are the remote and proximate causes of madness,

[1] Matthew, chap. xvii, v. 18; Mark, chap. i, v. 23, and chap. v, v. 15.

have been less regarded. Some have considered it as an infliction of Providence, for which neither alleviation nor prevention exists, and with which it would be profane to interfere; and in despair of a curative treatment, the least interference has been considered the best policy; and since madness and *sorcery* have been associated, we need not wonder at any indifference with which its condition may have been treated, until a recent date.

This inquiry will aim to bring the question within the rules of induction which guide other inquiries, and to show that diseased affections of the mind, and of the senses, may be traced to injury or decay, or to an abnormal condition of the organic structures.

The relation of madness with jurisprudence has hitherto been as intimate as with medicine; but inflexible legal codes, adapted to the interests of property and of material things, have proved inadequate to cope with the laws of physiology and life; and jurisprudence badly comprehends the interests of the lunatic.

As crime and madness equally forfeit social rights and privileges, the relation of insanity with crime is important, and is an illustration of its tendencies, and also of its influence upon society.

In discussing *the legal view of insanity*, perhaps an apology may be necessary; but the question of madness having been monopolised, and adverse and contradictory decisions given by the law, an attempt to enlarge the view, at present restricted by rigid and unnatural definitions, and decisions of an ancient and obsolete date, may be a benefit to the lunatic.

It would simplify the administration of the law, to admit the plea of insanity before the tribunals, with the under-

standing that the supposed lunatic, should be amenable to personal, *vivâ voce*, examination, which, on the eve of a verdict against his mind and responsibility, would be a rightful assertion, and exercise before extinction, of his mental prerogative and free agency. The lunatic, in stating his case, or in reply to interrogations, will often remove doubts and difficulties which have baffled the bench and the bar, and which the physician may have entirely failed to interpret to their satisfaction, although he may be enabled distinctly to trace their history to pathological and physiological phenomena.

Lord Mansfield's decision, and most recent jurists have adhered to it, allows only one test of criminal madness, namely, "an absence of the knowledge of right and wrong, or of good and evil," which is an *abstract* definition, and madness cannot be tested by its *opinions*, but by its *practices;* and it also has no physiological element or quality whatsoever.

"Absence of the knowledge of right and wrong, good and evil," being a commonplace and familiar characteristic of the practices of madness, should be limited as a test, to those varieties, in which there exists a total or partial *loss of understanding*. The impostor cloaks his defence, by an affectation of ignorance of right and wrong, upon which ground he seeks to establish his irresponsibility; but personal motives, and the ordinary incentives of ambition, advantage, and interest, will detect him; while the lunatic will not seek to evade responsibility, and sometimes encourages an analysis of his particular hallucination, to establish and confirm the view he has adopted, even when he knows its penal liabilities.

The general knowledge of right and wrong may be held to indicate reasonable conduct; but its absence does not

prove madness, since vice, natural ignorance, and brutality, equally denote the absence of a knowledge of right and wrong.

The precedents and authorities of the courts are meagre in reference to medical jurisprudence, and give forced analogies where experience fails them, while medical advocacy depends upon facts, physiology, and experience. And medical evidence is the more disregarded, from its tendency to include within a physiological equity, difficult to refute, the whole question as it regards the lunatic, and which, although jealously, is unavoidably admitted. The pleader feels his disadvantage in advocating a cause already out of the pale of society, and faces medical evidence with hesitation, in place of the audacity which usually characterises the forensic mind.

The inquiry, what has madness to do with the law? is obvious, and includes the questions of personal liberty and of property; to sue on the last gage for reason would cause apprehension to the plaintiff in his mental vigour, much more in his state of imbecility and decay, when he cannot inspire that life into the legal mind, which personal considerations might effect; thus property on the one hand, and regard for personal liberty on the other, are the issues. Through the establishment of secondary courts for the protection of the insane, security of property, and also of personal liberty, might be more easily effected; and if a jury were permitted to interfere upon sufficient evidence given of its necessity, or when property to a certain amount was involved, the present mode of certification and examination continuing, proper privacy might be maintained and great good be effected.

The most eminent jurists have widely differed in their deci-

sions—Lord Mansfield from Lord Erskine and Sir Joseph Jekyll. The earnest and conscientious conviction of Lord Denman, solemnly expressed from the bench, denying the possibility of the *existence of insanity without delusions,* within a few months was as formally and explicitly contradicted by Lord Campbell and Mr. Justice Maule; Lord Eldon as entirely opposed Lord Thurlow in the celebrated Portsmouth case; and Sir Joseph Jekyll took a different and more comprehensive view than the other jurists, in the Duchess of Cleveland's case, holding, "that the law will not measure the size of men's minds, so that they be, *compos mentis,*" directly opposed to Lord Mansfield's opinion, which requires a measure equal to "the knowledge of right and wrong, good and evil." Unfortunately, names of eminence amongst medical men are frequently arrayed as the advocates of entirely opposite opinions.

The tesselated character of our common and statute law is a mosaic illustrated by the learning, uprightness, and wisdom of the constitutional judges, who have adorned the bench and the courts; but its edicts are fickle and varying. It has no written code; settled cases, custom, tradition, and authority prevail; each fresh case that does not precisely tally with another, forms a new precedent. The forms and rules of the courts raise disputed questions, through which are determined the irregularities and false judgments which spring up in its bosom; and bench decisions have the force, and assume the dignity of legislative enactments. Lawyers may well blunder upon so uncongenial a subject as madness, and should hand it over to a *physiological inquest.* In a State where the exigences of commerce, the enterprising habits induced by manufactures, mechanical skill, and invention exist, a constant impetus is

given to the legislature to meet contingences induced by a versatile and ever-changing condition. Where landmarks are removed, to accommodate new circumstances and to satisfy the wants of an energetic and progressive community—*physiological investigations should form no part of the jurisprudence of the courts of law.*

The disposal of this question cannot be delayed; and in the settlement of the pleas of insanity, especially when connected with crime, the physician's experience will prove more available than the astuteness of the lawyer. And the object of this Essay, is to endeavour to establish, that *physiological* and *pathological* conditions, are the best tests for madness, in the place of *abstract* and *emotional* tests, which have hitherto prevailed, and found acceptance in the courts of law.

PHYSIOLOGICAL SKETCHES.

GUIDED by the experiments and inquiries of eminent physiologists, and aided by the logical inductions of Locke in his 'Essay concerning Human Understanding,' we will trace out of these different materials a succinct history of mental physiology; and we will endeavour in these Sketches to give a short analysis of the human mind, and to explain how the mind is constituted in health, and how it is influenced in disease.

The phenomena which characterise madness are, derangements of the senses, perceptions, consciousness, and ideas; which lead to mistakes in the performance of those offices for which sensation and reflection were endowed, and in the practice of the duties of social life, and which cannot be always traced to organic lesions. With our present knowledge we are unable to affirm that hallucinations, illusions, and delusions, result from disease of the cerebro-spinal and ganglionic systems, or that mania and delirium are traceable to disease on the brain. Sir Benjamin Brodie says,—"I cannot doubt that mental alienation is generally the result of some wrong condition of the body either functional or organic.[1]

To constitute a sound mind, *will*, *memory*, and *under-*

[1] 'Psychological Enquiries' by Sir Benjamin Brodie, D.C.L., &c., &c., p. 80.

standing are required, and a healthy condition of the external senses and of the circulating system: in short, there should exist physical and functional health.

Animal physiology is explained by analogies and homologues found amongst other classes of creation; but mental physiology is limited to the human race, which, in addition to a highly developed animal organization, possesses *mind* and enjoys *reason*; nevertheless man occupies but a small space in comparison with the extent of the creation; and with his possession of intellect and reason, he appears insignificant in the presence of the universe, and of the intelligence which created it.

Mental physiology shows an agreement of functional action between the cerebro-spinal and ganglionic systems, constituting *nervous unity*, which is essential to mental health, and which is manifested by correct senses; and a disturbance of this nervous unity, is the proximate cause of madness. If the cerebral functions are in *excess*, the functions of organic life, namely, the circulation, respiration, digestion, assimilation, and secretion, become, in the contrary direction, impaired and diminished; during which, visions, mania, and delusions may occur, with great consequent irritability: if, on the other hand, the animal and vital functions are in excess, the cerebral and intellectual faculties may become weakened. Excessive mental action, withdraws, and diverts the nervous power, from other parts to the brain, and thereby exhausts the organic and vital system, and induces indigestion and sleeplessness, which are the common precursors of insanity: as also, a large brain, accompanied with small and weak animal powers, gives a tendency to physical exhaustion, which reacts upon the brain, and which indirectly produces also indigestion and sleeplessness: but, on the

other hand, if large vital and physical powers are developed, and the circulating, respiratory, and digestive functions are unusually vigorous, the nervous *equilibrium*, if exhausted under such circumstances, by excessive cerebral action, is, notwithstanding easily restored, having so much vitality to fall back upon, to sustain it.

In madness, *emotional* manifestations are apt to be chiefly regarded, and less consideration and attention is usually given to physical and functional conditions. But emotional manifestations, frequently exist without any pathological signification or value, as in hysteria, catalepsy, somnambulism, and drunkenness; and in many cases of mania, this influence is transitory and unimportant: notwithstanding which, emotional demonstrations, are frequently the first manifestations of mental disease; and, if at that time functional error and disturbance be not discovered, we often seek in vain for other pathological explanations, either during life, or upon *post-mortem* examination; which may be attributed to the circumstance that madness is almost always a *secondary* disease. But mania and delusion may occasionally be traced through pathological conditions, to the circulating and assimilating systems, and accompanying which, will be found an impaired state of the functions of secretion and elimination.

The seat of disturbance, is the brain, and the condition set up, a state of *irritability*; and which very often occurs from deficient power of the heart and circulation: and if we could trace mental error to well-ascertained functional conditions, as in other diseases, and demonstrate that errors of will, memory and understanding, diseased judgment, senses, and perceptions, resulted from certain states of the nervous and circulating systems, insanity would be easy to comprehend: and it will be our object to show the capability of

physiology, to explain many pathological conditions connected with insanity.

Haller[1] calculated that one sixth of the blood from the left ventricle, is carried to the head, though the weight of the brain in the human subject, is not more than one fortieth of that of the whole human body; but, taking the amount of blood going to the head, at less than half the proportion stated, the supply to the brain would be singularly large in comparison with any other part of the body. This is the more extraordinary, since no lymphatics have been discovered in the brain, and cerebro-spinal systems; the molecular development of the brain, moreover, is slow, and not in proportion to the growth of other organs; and the progress of repair and reproduction of parts is also exceedingly defective; in short, it is doubted if in loss of parts, or solution of continuity in the substance of the brain, granulations are ever completely established. It is an interesting question, what is the destination and use of this large supply of blood, a diminution or deterioration of which, is attended with such serious derangement and disease, as witnessed from sudden loss of blood, in puerperal hemorrhage, as also in the mania resulting from starvation, and from other causes.

Although we are unable to explain, in what way the disproportionately large supply of blood is appropriated in the brain, since there is no vascular secretion discoverable in its elaborations, yet, we know that so long as the integrity of the circulation continues to be maintained, a healthful state of mind exists; and if otherwise, the contrary occurs, as a physiological fact.

"Bichat has shown that the influence of the scarlet, or

[1] 'Elémens de Physiologie de M. Alb. de Haller,' &c. &c., traduit par M. Bordenaux, Paris ed., chapitre xii, § cccxli.

arterial blood, is necessary to the due performance of the cerebral functions. If dark-colored, or venous blood be substituted, and transmitted to the brain by the arteries, the animal lapses . . . . . into a state of total insensibility to external impressions."[1]

The sources from which intellect and intelligence proceed, are seated in the superior, and anterior portion of the brain, in the hemispheres; from which the functions of the mind, namely, consciousness, reflection, will, and memory proceed. The special senses which adjoin this centre of intellect, supply it with facts, upon which it operates; and through their expression is the manifestation of reason. Destroy the hemispheres, and will, and memory cease, and although voluntary motion continues, it is not governed by will, and intellect.

If, on the other hand, you destroy certain central portions of the brain, namely, the lobes of the *corpora quadrigemina*, as described by Desmoulins, Flourens, and Hertwig, and also by Magendie, voluntary motion is destroyed, but the intellect continues. In the *results* which M. Hertwig obtained, he says . . . . . "No. 7.—That no other effects than those mentioned follow the mutilation of the *corpora quadrigemina*; thus, for example, that no disturbance of *memory*, or *consciousness* is produced."[2]

And Professor Carpenter says, "that the *thalami*, and *corpora striata*, are subservient to the conversion of *sensational* impressions and volitions into combined movements, adapted to the preservation and welfare of the individual, without the intervention of judgment, or the proper functions of the mind."

[1] Brodie's 'Enquiries,' pp. 71, 72.
[2] Müller's Physiology, v. i, p. 829*.

Müller says,[1] "It is evident from these experiments (of Flourens and Hertwig), and upon the effects of pressure upon the cerebral hemispheres in man, that they are the seat of the mental functions, that on them the sensorial impressions are not merely perceived, but are connected with ideas; and that in them resides the power of directing the mind to particular sensorial impressions, *the faculty of attention.*"

The provision of the two *hemispheres,* (virtually two brains)—so, that if one half of this double brain, should receive injury or destruction, the mind, through the other half, may still continue its functions—and, also of the equally admirable function of the *commissures,* through which the hemispheres may be simultaneously informed, by the senses and perceptions of those external objects which give origin to all mental actions, have no equal or parallel in the range of animal organization. If you destroy the hemispheres, although you do not thereby destroy *sensation,* which is seated below the hemispheres in the *medulla oblongata,* the intellectual faculty—the mind, no longer exists, and you destroy consciousness, will, memory, and understanding; and vitality only remains, and its continuation will be limited, since vitality alone is not sufficient for the human economy.

The difference between the brain and other secreting organs, consists in this: the brain gradually increases its power of producing or secreting ideas, as its maturity progresses, or as age advances, and in the new-born child, and in infancy, *instinct* prevails, *since* intellect is not developed. And, in a state of civilisation, the brain becomes matured by education, as well as by experience and knowledge; and the powers of reason greatly depend upon the acquirements, which time and experience alone can confer. A healthful brain increases in

[1] Müller's 'Physiology,' Baly's translation, v. i, p. 835*.

vigour, a long period after the *animal functions* have ceased their development and maturity; and the mental functions and powers, are small at the commencement of life, and are feeble for a long period, and only gradually arrive at complete development.

Maturity of the mind and intellect, by the influence of education and knowledge, neutralizes those qualities which, in savage life, constitute the broad and manifest distinction, of one order of minds from another, and upon which depends, in a great measure, the influence and domination exercised over the affairs of mankind, by superior minds, amongst uncivilised races in the dark ages of the world.

With reference to the suggestion, that the functions of the brain, are manifested after the manner of a gland, Solly says, "The cineritious, cortical portion of the hemispheres, consisting of vesicular neurine, and which is the vascular medium through which the vessels which nourish the hemispheres pass, is similar to the cortical structures of glands—the kidneys for example; and that it is the secreting medium, as the medullary is the conducting medium of the nervous functions."[1] And again, "We believe that the peculiar power of the nervous system resides in the cineritious portion."[2]

The functions of consciousness, perception, and ideas; the acts of memory, will, and understanding, are thus secreted by the vesicular neurine; for analogy familiarly and consistently explains, how sensations and perceptions thus secreted, are also communicated, through the medullary matter of the nervous fibrils, and how their secretion in the hemispheres, is similar to secretions in glands. And we may say that

[1] Solly 'On the Human Brain,' p. 7.
[2] *Vide* Brodie's 'Psychological Enquiries.'

consciousness, will, memory, imagination, and understanding, are *sensorial secretions* and are supposed to be especially seated in the convolutions of the hemispheres. And the opinions given by Müller, upon the office of the cerebral hemispheres, although they do not positively declare so much, assist to establish a similar view.

Thus Müller, in speaking of the mind, says, "Everything which feels or moves voluntarily in accordance with its desires, is endowed with a mind."[1]

"As soon as they feel, they must have thoughts and desires, for where there is sensation, there must be pain and pleasure, and where these exist, desires must exist likewise."

"The peculiar quality of the mind is *consciousness*, a something of which no further definition can be given, and which admits of description as little as the states or properties called round, blue, red, or bitter. Just as it is the property of a specific nerve connected with the sensorium to have sensibility, so it is the property of the brain to have consciousness. The conception of ideas, thoughts, and emotions, or the affections, are modes of consciousness. There is no sufficient reason for admitting the existence of special organs or regions set apart in the brain for the different acts of the mind, or for regarding them as distinct functions."[2]

Thus, physiologists agree that the seat of the mind is in the brain; and that the *sensorium commune* is seated in the anterior cerebral hemispheres; and that the larger the development of the convolutions, the larger is the development of the functions of the mind: and, also, that the "source of power" is in the "*vesicular neurine*" of the grey ganglia; and that the "conductor of power," or what might

[1] Müller, v. ii, 1832.
[2] Müller's 'Phys.,' v. ii, p. 1345.

be termed the *potential nervous current*, is in the "tubular neurine" of the medullary matter. Solly says, "If there is one point in the physiology of the brain more unequivocally demonstrated than another, it is that these ganglia, the *cineritious vesicular neurine*, are the instruments of the mind; the portions of the brain in which sensations are converted into perceptions, and give rise to ideas; and comparative anatomy, developmental anatomy, experiments on the living animal, observations on its size and form as indicated by the size and form of the skull, and last, but not least, pathology,—all afford a mass of overwhelming evidence that this portion of the brain, and this only, is the cerebral organ of intellectual power." Again: "It is evident that they, the cerebral hemispheres in man, are the seat of the mental functions; that in them the sensorial impressions are not only perceived, but are connected with ideas, and that in them resides the power of directing the mind to particular sensorial impressions."[1]

Müller says, "For consciousness, imagination, thought, volition, will, and passion, the brain is absolutely necessary."[2] To these may be added memory, understanding, and ideas, as constituting the elaborations of the mind. Locke says, "It," Reason, "perfectly fails us where our *ideas* fail. It neither does nor can extend itself further than they do; and, therefore, wherever we have no ideas our reasoning stops, and we are at the end of our reckoning."[3]

And again, "Comparative anatomy alone suffices to show us that the source of the mental faculties must be sought for in the brain; and experiments on animals, as well as the history of the lesions of the brain in comparison with

[1] Solly, 'On the Human Brain,' pp. 335-6.
[2] Müller's 'Physiology,' v. i, p. 818*.
[3] Locke, 'On Human Understanding,' v. ii, pp. 301-2, § 9.

those of other organs, confirm this suggestion. We have now, in the first place, to prove that the *mental* functions are performed in no other parts of the nervous system, or of the body generally, *but in the brain alone.* With regard to the nerves we learn from the effects of lesions, that when cut off from communication with the brain they are withdrawn from the influence of the *will,* and impressions on them are no longer perceived." . . . . "On the other hand, the upper portion of a divided nerve, and the part of the spinal cord above the seat of the lesion, are still subject to the influence of the *will,* and the mind is made conscious of impressions made upon them."[1]

"The phenomena of the mind, whatever be the nature of its essence, are without doubt closely and necessarily connected with the organization of the brain."

"While, therefore, the *medulla oblongata* is susceptible of *obscure* sensations, the distinct perception of sensations is dependent on parts of *higher* functions, which are lost when the cerebral hemispheres are removed.

"Some have believed that the medulla oblongata is the central organ of all sensations; this appears to me to be an error, if by medulla oblongata be meant only the superior enlarged portion of the spinal cord, and not also its prolongations into the cerebrum."[2]

In treating this subject, Sir B. Brodie also says, "The *corpora quadrigemina* are four tubercles which connect the *cerebrum, cerebellum,* and *medulla oblongata* to each other. If one of the uppermost of these bodies be removed, blindness of the eye of the opposite side is the consequence. If the upper part of the cerebrum be removed, the animal becomes blind. . . . . The most important part of the

[1] Müller's 'Physiol.,' v. i, pp. 814*-5*.

[2] Ibid, v. i, p. 827.

whole brain seems to be a particular portion of the central organ, or *medulla oblongata*. While this remains entire the animal retains its sensibility, breathes, and performs *instinctive* motions. But if this small mass of the nervous system be injured, there is an end of the animal functions, and death ensues."[1]

Müller says, "An animal in which the cerebral hemispheres have been removed, no longer *reasons;* but, nevertheless, *it feels.*"[2]

The functions or operations of the brain, are produced in a different manner from other functions in the animal economy, and are governed by different laws.

The brain having the function of *consciousness*, not only derives intelligence from external objects, which it does through the senses, (which in itself is a peculiarity;) but independently of them, and by reflection the brain obtains intelligence, ideas, thoughts, and imaginations from its own internal operations and impressions, *which is consciousness;* and communicates them to be acted upon through the functions of volition and of the will; and it directs and guides its own elaborations, and can compare and reflect upon both internal and external impressions, derived through the senses, at the command of the *will:* and which latter, is what Locke defines to be *intellectual liberty*.

And the brain also derives impressions, ideas, and sensations, through the nerves of *animal* and *oragnic* life; since *consciousness* is manifested, when the special senses are lost or suspended, either from injury or disease; and Sir B. Brodie says, that "consciousness may be influenced by physical impressions of various kinds, communicated from

[1] Brodie's 'Enquiries,' pp. 46, 47.
[2] Müller's 'Physiology,' v. i, pp. 826.

other parts of the corporeal system, ... through the medium of the nerves; not as the immediate result of impressions on the external senses, or of anything that was passing on the mind previously."[1] Thus, while intellect is peculiar to the *cerebrum*, the posterior lobe of which is peculiar to man and to higher intellect only, Brodie says, "the *medulla oblongata, cerebellum, thalami, corpora striata,* and *tubercula quadrigemina* . . . . . are connected with that class of phenomena which belong to the animal appetites, and instincts."[2]

Again, "The cerebellum belongs more especially to what Bichat has called *organic life*, and furnishes the nervous force required for the action of the heart, respiration, digestion, and the other more corporeal functions. It is also the part principally connected with the animal instincts (instinctus mere naturales), and the emotions; but not exclusively, as the other bodies situated in the base of the brain belong to the instincts and emotions also."[3] Flourens and Hertwig consider the *cerebellum* subservient to the "co-ordination of muscular action." The experiments of M. Flourens are more lucid and more decisive in their results. "He found that the animals evinced no signs of sensibility in the cerebellum while it was being removed. He extirpated the cerebellum in birds by successive layers; . . but their sight and hearing were perfect; . . . Volition, sensation, and memory, therefore, were not lost, . but merely the faculty of combining the actions of the muscles in groups, and the endeavours of the animal to maintain its equilibrium were like those of a drunken man."[4]

[1] Brodie's 'Enquiries,' p. 70.
[2] Ibid., p. 176.
[3] Ibid., Notes, p. 264.
[4] Müller's 'Physiology,' v. i, p. 830*.

The *medulla oblongata*, is ancillary to the manifestation of the functions of the cerebral hemispheres; it being the seat of the faculty of sensation, motion, and volition. It concentrates the senses for the use of the brain, and becomes *co-ordinate*, in the development and performance of the functions of the cerebral hemispheres.

The *medulla oblongata* is the seat of *volition*, as well as of motion and sensation. Volition is distinguished from *will*, which latter is intellectual, and is derived from the hemispheres, and is supposed to be seated in the grey substance, or vesicular neurine of the convolutions.

The *medulla oblongata*.—"It is the seat of volition; the experiments of M. Flourens show, that animals in which the cerebral hemispheres have been removed, though in a state of stupor, are still capable of executing voluntary movements; and they have still the power of volition after the removal of the cerebellum also; but by this last mutilation, their movements are deprived of force and co-ordination. *The medulla oblongata is the seat of the faculty of sensation*;—this is not merely shown by the anatomical fact that all the cerebral nerves, with the exception of the first and second, are connected with it, or with its prolongations in the brain. . . . . From the researches of Magendie and Desmoulins it results that the removal of the *cerebral hemispheres* and the *cerebellum, does not deprive an animal of the power of sensation.* The central organs of the senses of sight and smell are lost with the cerebral hemispheres, and blindness ensues; . . . . . The animal has doubtless lost its memory, it no longer reasons, but nevertheless it feels, and the *sensations* excite in it movements which are different from the phenomena of mere nervous reflection. Cuvier very aptly

compares animals in this condition to a sleeping man; he also seeks an easy position; *he feels.*" [1]

The nerves of sensation, all but the first and second pairs, are derived from the *medulla oblongata,* or from its prolongations in the brain, and are carried to the hemispheres through the commissures. Müller says, "Some have believed that the medulla oblongata is the central organ for all sensations. This appears to me to be an error, if by medulla oblongata be meant only the superior enlarged portion of the spinal cord, and not its prolongations into the cerebrum." [2]

"The capacity of the mind in different animals manifestly increases *pari passu,* with the extension of the surface of the cerebral convolutions." [3] Sir B. Brodie says, "The surface of the hemispheres is formed into folds, or convolutions, and as the fissures by which they are separated are deeper, and more numerous, so does the *grey,* bear a larger proportion to the *medullary* substance." [4] And again, "The nervous force is supposed to be generated in the grey, or vesicular substance, of which the greater part is expanded on the surface of the cerebral hemispheres, the extent of that surface depending not so much upon the bulk of the entire brain as on the number and depth of the convolutions." [5]

Thus we have stated that *will,* which is a mental function, is different from *volition,* which is an animal function, and the latter originates the spontaneous and instinctive movements of animal life.

[1] Müller's 'Physiology,' v. i, pp. 826*, 827*.
[2] Ibid., p. 827*.
[3] Ibid., p. 835*.
[4] Brodie's 'Enquiries,' p. 178.
[5] Ibid., p. 238.

The government of *will is* necessary to a healthful mind, and also, to a healthful and sound state of *volition*. A defective function of will, under any circumstances, whether caused by injury or disease, induces, more or less, a manifestation of a disordered mind, and is frequently the proximate cause of madness.

Thus all these authorities agree, that the function of *volition*, is seated in the *medulla oblongata*, and is manifested by sensation, and the contraction of muscular fibre, producing voluntary motion in man, and among the higher animals; and is *governed by the will.*

And for the proper co-ordination of the will, with volition, the cerebral masses should be in health; for the function of volition cannot be correct, if the mind and intellect be diseased. But the functions of organic life, respiration, circulation, and digestion, may go on, if the cerebral masses be diseased; or if removed, as proved by the experiments of M. Flourens.

The *Understanding*, originates in, and is derived from consciousness, perception, reflection, will, and memory; from which also, in a healthful and vigorous state of the mind, result imagination and ideas: and understanding is seated in the hemispheres.

Locke says — there are certain qualities or conditions which are required to constitute the understanding, namely, perception, reflection, consciousness, memory, and *will*, or *liberty*; the latter he opposes to necessity, and considers necessity passive or physical; and liberty vital, mental, and active; he says "....we find in ourselves a power to begin, or forbear, continue, or end, several actions of our minds, and motions of our bodies, barely by a thought, or preference of the mind ordering or commanding the doing

or not doing such a particular action: this power which the mind has thus to order the consideration of any idea, or the forbearing to consider, or to prefer the motion of any part of the body to its rest, or *vice versa*, in any particular instance, is that which we call the *will*." [1]

The function of *will*, is a superior one to that of *volition*, and in practice frequently represents *judgment*, by its influence upon, and regulation of the actions and government of the mind.

Will, is as much a function of the *mind* as is *consciousness*, *memory*, and *understanding*.

Consciousness and understanding may exist; but if *will* be defective or diseased, confusion and derangement of ideas occur, and delusions will become manifested; and often delirium and mania will follow.

The *organic* functions, seated principally in the cerebellum, are different from the cerebro-spinal, and are beautifully manifested in the *fibro-rhythmical* action of the heart, intestines, and vascular system, and of the respiratory functions; sympathising also with the ganglionic centres; and in their mode of action, they are continuous, under the impassive laws, which govern with automatical and rhythmical precision, the functions of animal life: and in the cerebellum is also seated the passions and emotions.

In relation to mental physiology, we therefore find *will*, and *volition* distinct functions. Will, being seated in the hemispheres is an intellectual; and Volition, which is seated in the medulla oblongata, and its prolongations, is an animal function: and it is also partially manifested in the fibro-rhythmical actions of organic life.

Volition results from *sensation*, and is manifested by

[1] Locke 'On the Human Understanding,' v. i, p. 192.

motion; and to a great extent, it is directed and governed by the will, which preserves the *nervous* co-ordination and *unity:* and *consciousness* exists of the mental act, or object upon which the will is fixed, which *volition* on the other hand automatically performs. *When, and whatever, the will demands, volition, if correct, instinctively obeys its mandates.*

In the lower animals, instinct is always manifested by volition and motion, and *for limited and isolated objects* it is superior to, or at any rate transcends, the inventions of reason and intellect; and it is also sufficient for the preservation of the animal, to secure its safety, and to gratify its sensuous wants, and desires. But in them the hemispheres, the convolutions, and the grey substance, being small, the *will* is small; and in their economy, volition increases, in the *ratio* of the diminution of the will: which explains the wonderful manifestations of *instinct,* and the perfection of its results.

And in the lower animals, whose wants and economy are very limited, material, and sensuous, they being only appetitive, and motive in their natural habits, instinct is a good and sufficient substitute for reason.

The Human mind is formed for a wide range of intelligence, beyond the volition, sense, and motion of the lower class of animals, and is seated in a highly organized economy; and is not limited to isolated and special objects and results, and therefore it cannot retreat within the narrow sphere for which *instinct* is ordained; and with bereavement of *will* and *intellect,* the mind consequently becomes helpless, forlorn, and mad.

We find also, if the mind be small or weakened, that volition will act without being governed by the *will,* and

thus madness occurs: *and in this manner the mind of the idiot also manifests instinct,* by an excessive and inordinate display of volition, sensation, and motion.

Will, frequently represents reason in man: and *instinct,* which is the representative and substitute of reason in the animal creation, often manifests wonderful contrivance, motive skilfulness, and artful results within its narrow, and isolated sphere of action.[1]

Will and *volition* are used synonymously by Dr. Abercrombie, Sir B. Brodie,[2] and other physiologists;[3] but we have endeavoured to show, that *will* is mental and intellectual; and that volition in the human subject is greatly dependent upon will.

Instinct, in the lower animals is substituted for reason.

Volition, is manifested in a limited degree in vegetable life, by *motion,* if not by *sensation.*

Locke further says, speaking upon the subject of *will* (on which occasion he uses the terms *liberty,* and *will,* indifferently), "Liberty is a power to act or not to act, according as the mind directs. A power to direct the operative faculties to motion, or rest in particular instances, is that which we call the *will.*"[4]

During the existence of delusions, delirium, and mania, *volition* acts without government or control of will, as also during convulsions, fits of catalepsy, somnambulism; and even during drunkenness, volition acts independent of, and unknown to the will.

[1] Müller's 'Physiol.,' v. i, p. 826*.

[2] Brodie's 'Enquiries.'

[3] 'The Philosophy of the Moral Feelings;' by John Abercrombie, M.D., pp. 102 and 330, edition 1843, New York.

[4] 'An Essay concerning the Human Understanding;' by John Locke, v. i, p. 231.

Attention, implies *will*, and memory and understanding; Müller says, "Sensation itself must be distinguished from 'attention' (the direction of the mind to sensations) and from the faculty of forming ideas from sensations. Among a certain number of simultaneous sensations, we are able to direct our *attention* to a single one, so as to perceive it not only more distinctly than the rest, but definedly, and in its whole intensity: this sensation excites in us ideas, while those to which *attention* was not directed are perceived but only indistinctly. *Attention* appears to be a function of the cerebral hemispheres. While, therefore, the medulla oblongata is susceptible of obscure sensations, the distinct perception of sensations is dependent on parts of higher function, which are lost when the cerebral hemispheres are removed; by their removal the animal is rendered stupid, though sensation remains." [1]

Thus, we find the physiological signs of madness, are errors of *will*, *memory*, and *understanding;* and in consequence of madness, the governing power of *will*, over *volition* becomes suspended.

The Emotional, or passional signs, and manifestations of madness, are exaggerated expressions and demonstrations, namely, convulsions, catalepsy, mania, and delirium; and even the somnambulist, cannot be held responsible, for criminal acts done while asleep, when volition acts independent of the *will;* somnambulism, is consequently included, as an emotional manifestation.

Memory, is seated in the Hemispheres.

Memory, in relation to the human mind, stands highest, and assumes the character of *judgment* and *reflection* combined. Locke defines memory in the following words—

[1] Müller's 'Physiol.,' v. i, p. 827*.

"Memory is an intelligent creature, is necessary in the next degree to perception, it is of so great moment that when it is wanting all the rest of our faculties are in a great measure useless; and we, in our thoughts, reasonings, and knowledge, would not proceed beyond present objects were it not for the assistance of our memories."[1]

Sir B. Brodie says—"It would be easy to multiply examples such as these. . . . . They show also that it is not in every part of the nervous system, but in the *brain*, that memory resides. The faculty is injured by a blow on the head, or a disease affecting the brain; but not by an injury of the spine, or a disease of the spinal chord. The eye may be amaurotic, but Milton and Huber retained the memory of objects which they had seen previously to their blindness, &c." Sir Benjamin differs from Müller, in thinking that there are special organs in the brain for locomotion, and speech, and also for memory.[2] Müller says, "No part of the brain can be distinctly pointed out as the seat of *memory*, of *imagination*, &c. Memory may be lost as a consequence of lesion of the hemispheres, *at any part of their periphery*: and the same is the case with regard to all the principal faculties, or tendencies of the mind."[3]

The memory is soon affected, and becomes greatly impaired, and nearly obliterated in maniacal attacks; and after a time, that is after long-continued maniacal paroxysms, it becomes almost destroyed. Some, according to Haslam, losing in a wonderful degree their former correctness of orthography; but this must be considered only a type, it

[1] 'An Essay concerning the Human Understanding; by John Locke. v. i, p. 114.

[2] Brodie's 'Enquiries,' p. 59.

[3] Müller's 'Physiology,' v. i, p. 836.*

being the most common and familiar test of memory:[1] the first manifestation of a want of power in the brain, either of a weak brain, or on the approach of *ramollissement*, is generally a defect of *memory*.

The next constituent of a sound mind, namely, *understanding*, consists of consciousness, sensation, perception, and reflection, which give birth to ideas. Locke says—"All ideas come from sensation and reflection" . . . . "and the mind furnishes the understanding with ideas of its own operations;"[2] and again, he says, "this great source of most of the ideas we have, depending wholly upon our senses, and derived by them to the understanding, I call *sensation*."[3]

Brodie also remarks, ". . . . . It is not unreasonable to suppose that the brain, like some other of the organs of the *new born child*, is in an unfurnished state, and therefore not fitted to retain the impressions made on it during any considerable period of time."[4]

A man must first have been reasonable, to have become afterwards mad, since, although he may have been born an idiot, blind, and deaf and dumb, he cannot be born with *mania*, *delusions*, or *madness*, since they imply the development of intellect, and mind, as a precedent state or condition; but if the brain be abnormal, the *formative* tendency to madness may exist, but, during infancy, in the absence of ideas madness cannot be manifested.

And we find the senses are for a long period of early human life, employed in storing up a magazine of materials, for reflection, memory, and consciousness to operate upon, and which ultimately constitute *understanding;* and the mind does

[1] Beck's 'Elements of Medical Jurisprudence,' p. 220.

[2] 'An Essay concerning the Human Understanding,' v. i, p. 114.

[3] Ibid., pp. 67-8.

[4] 'Enquiries,' p. 67.

not arrive at maturity, or to the state of perfection of which it is capable for many years after the commencement of life.

If sensation, and reflection be overthrown, consciousness falls also; showing the agreement and connection of consciousness with sensation and reflection, as also with memory and will: and with the loss of these comes disease, and a deprivation of the *understanding*. In this state delirium is manifested.

Imagination, is a phenomenon peculiar to the human mind, and one of its most admirable qualities, and is generally a manifestation of a mind in a healthful and vigorous state, but not always; the mind occasionally manifesting an excess of imagination, while suffering under disease, and when memory, will, and understanding are obscured and absent.

Wit, and invention, or a capability to construct out of common ideas, and out of common things, and impressions, uncommon creations and ideas, is a faculty of the imagination; and imagination may be considered one of the qualities characterising a superior mind.

We consequently arrive at the conclusion, that with the ability to exercise completely the functions of *will, memory, and understanding*, is established the domination of reason: and to constitute a responsible state, or mental sanity of the lowest character, that is to say, a condition approaching to a *weak mind, but not arrived at madness, two* at least of the functions above named must exist, and be properly practised in the performance of the duties of the social state.

And we also arrive at the conclusion, that the *absence* of will, memory, and understanding, the *presence* of which is the

normal state of the human mind, constitutes *madness:* and the absence of one of them *only,* will reduce the mind to the state of a *weak mind.*

And the Argument resolves itself, into the three following Propositions: (supposing pre-existence of the Life Element.)

1. The Senses are necessary to the manifestation of Reason.

a. *Sound senses, are necessary to form a sound mind.*

2. The Impression of external objects, passed, or impelled by the senses through filamentous tubes, originate Perceptions, and Ideas in the vesicular cells.

3. The Vesicular cells of the Nerve Matrix, excited by the current of senses and ideas, originate or induce the functions of *Will, Memory,* and *Understanding.*

From the above, we may infer without difficulty, *a Cellular Theory of Mind,* and of *Nerve Force,* as follows:

1. *The Apparatus of Power,* (Source) is the Vesicular cells of the Nerve Matrix.

a. *These Cells, (which are passive or dormant in early life and infancy, until excited by the senses,) act synergetically, in the greater degree, or the more the senses become used, and the more ideas become generated; and the apparatus or source of power, becomes increased both in volume and development, the more it is exercised, and excited by the Senses.*

b. *And the Force will be* plus, *or* minus, *in the* ratio *of the excitant, (the Senses and Ideas,) its strength, or weakness; and in proportion to the number and volume, great or small, of the Vesicular cells.*

2. *The Conductor of Power*—is, namely, the Medullary Bundles of filamentous or fibro-cellular Tubes, Ganglia, or Medullary Coils.

a. Müller says, "*The action of the mind is dependent on the integrity of the fibrous structure and composition of the brain . . still this amounts to nothing more than that the brain, by its organization, is the instrument by which the mind operates, and is active.*" [1] *And again, at pp.* 838*-9*: "*Their action* (*the primitive fibres of a nerve*) *is propagated in each, in an isolated manner, from the periphery to the central organs, and from there back again to the periphery . . . and between the fibres, there is, particularly in the grey substance, a granular matter which appears to accelerate the communications, from one fibre to another.*"

b. The Medullary bundles, "*fundamental*" *or* "*decussating,*" *form alternate layers, in the following parts of the base of the brain, namely, in the corpora pyramidalia, quadrigemina, olivaria, cerebullum, and medulla; and* Müller says again, "*that at this point*" (*the Olivary body,*) "*the grey column, forms a plicated vesicle of grey matter, filled internally as well as iuvested externally with white fibrous substance.*"[2]

3. *Excitants,* are the Senses and Ideas, which are derived from the Impression of external objects.

a. *The* Senses, *commence the circle at one extremity of the fibro-filamentous tubes, which becoming impelled, or passed through the vesicular cells, Ideas are originated; and it terminates at the other end of the circle, by* Induction of WILL, MEMORY, *and* UNDERSTANDING, *in the Cerebral Mass, or* NERVE MATRIX.

b. *Which may be thus expressed*—

Give normal Senses, (external and internal);

Give normal fibro-filamentous tubes, through which

[1] Müller's 'Physiology,' v. i, p. 817*, 819*.

[2] Ibid., p. 825*.

senses are impelled; and vesicular cells;—and you as the result,

Give REASON, OR A SOUND MIND; manifested by WILL, MEMORY, and UNDERSTANDING.

One of the most painful consequences of madness is, that it affects the *moral* character, as well as the understanding, and thus directly influences society: and the moral principle often decays, and sometimes becomes extinct, and thus the lunatic becomes brutalized, and degraded.

PATHOLOGICAL SKETCHES.

Disease of the mind has hitherto been considered more as a *moral* affection, and little subjected to medical treatment; and remedial measures have been directed almost exclusively to the superintendence, police, and custody of the insane.

In most other diseases a *diagnosis* can be offered, but this is not the case in the pathology of the mind, which is little understood and explained.

In madness, a new element disturbs the pathological phenomena, namely, the special senses, perception, judgment, and sensation, become erroneous, being either totally extinct; preternaturally dull, or acute; and otherwise defective. Thus, two patients having the same train of symptoms, rarely describe them in the same manner; and the replies of the patient, who is generally restless and suspicious, cannot be regarded or depended upon, until his confidence has been obtained; and his confusion and hesitation confirm how incapable he is, even when desirous, to assist in explaining his condition, or to describe his sensations and symptoms, which on recovery, he will state to have been of the most painful character; and he will evade inquiry, on some occasions from incapability, on others from apprehension and fear, which are constant attendants upon diseases of the senses.

In moral insanity, called also *partial insanity*, and *mono-*

mania, on the onset of the attack, neither hallucinations nor delirium may be manifested, but a composed, clear, and vigorous intellect may exist; which nevertheless frequently terminates in raving madness. Nor should the idea of *partial insanity* be received or entertained, for where there is *monomania,* there is total madness; or, at any rate, madness should be considered to be the rule. When hallucinations and illusions exist, the patient, convinced of their truth, acts upon their suggestions, which, on restored health, seem to have been a dream, or a suspension of personal identity.

Delusions in *monomania,* and in other states of insanity, may remain silent, till discovered by some accidental outbreak, when demonstrations of a painful character unexpectedly occur.

Confidence can rarely be placed in the patient's intelligence, and truthfulness, and no physical signs, or evidences present themselves to unravel the history of the case. The pulse, the complexion, and expression of countenance, are the only physical guides afforded, and are not implicitly to be trusted; but the pulse is generally compressible, irritable, languid, and sometimes intermittent. In hypochondriasis it is preternaturally slow, not exceeding forty or fifty pulsations in the minute, with a clear perception and calm intelligence, except upon some abstract idea: circumstances which denote congestion and disturbance of the nervous centres of organic life. Whether the pulse be slow or quick—and it may be both within a very short period—it always indicates a feeble action of the heart, with tardy secretion, and a defective action of the capillary system of vessels. One redeeming circumstance is, that these diseases are almost always amenable to curative treatment, if it be early administered.

The delusions of madness, present a curious interest: psychological visions and images become fixed upon the mind, and although they may come under subjection, are seldom thoroughly erased, and every disturbance will find a centre of sympathy in the dominant error, and visions and illusions are frequently recalled, and rise up as evidences of the mischief passed, and monitors for the future. This state will be revealed to those who have inspired confidence, and obtained a tranquil influence over the susceptibilities of the convalescent; and they present a strange *camera obscura* of intellectual error; and often, upon the proud lineaments of mental supremacy, the most enduring hallucinations of this nature become fixed, as in the instances of Dr. Johnson, Robert Hall, and the poets Cowper, Byron, and Percy Bysshe Shelley. It would be well if this confidence were always bestowed. "Had Robert Hall lived in the present day, it is more than probable he might have been cured of the delusions which rendered so good a man miserable. Had he lived a little earlier his aberration might have been rectified by fire and fagot, and the other tender mercies of the day."[1]

Delusions, long harboured and smothered, break out into homicidal and suicidal acts, which might, on many occasions, have been averted. These considerations enforce the necessity and obligation of a judicious classification of the afflicted, a classification suited to the intelligence, training, and intellectual qualities; since the mind in which may have been implanted the nicest refinement, may be penniless in pocket, and brutality may hold a heavy purse.

These are painful revelations of the unsuspected ruin that frequently exists, and may at any moment overwhelm a noble mind.

[1] 'The Duality of the Mind,' by A. L. Wigan, M.D.

The *diagnosis* of madness should be based, if possible, upon physical or intellectual, and not upon *emotional* phenomena; which when present cannot be relied upon as evidence of madness; especially as nervous disturbances may exist unconnected with insanity, and be attended with great emotional manifestations: and in short, it should be limited as far as possible to the same rules which govern the *diagnosis* of other diseases.

The terms used to define the various characters of mental disease, are *symptomatical* terms, and have no definite relation to any two cases of madness; and for so much are consistent, since insanity cannot often be considered to be an *idiopathic* disease, and consequently, is manifested in a variety of phenomena.

The safest definition perhaps of insanity is, that it is a *nervous disease, unattended with suffering or physical pain;* while most other functional and physical diseases, and especially those which are called *nervous,* are accompanied, more or less, with physical pain and suffering; insanity, on the contrary, is not unfrequently attended with agreeable sensations, and sometimes with a state of cheerfulness, serenity, and happiness. But the terms being often indifferently and indiscriminately applied to mental and physical diseases, are very inappropriate and delusive.

Systematic writers describe "acute insanity," but the term *acute* is used by nosologists to describe a state of increased power or action of the heart and arteries, with paroxysms of *pyrexial exacerbation and recurrence,* attended with rigors or collapse; which is not the characteristic, and does not accompany what is called *acute insanity:* again, what is called *intermittent insanity,* has no rigor or cold stage, no pyrexial exacerbations, and no

sweating stage, to constitute a parallel with what is called *intermittent fever*, and *ague*.

In short, the analogies between the phenomena of mental and physical diseases are so slight, that to use similar terms, or which have the same signification, for both, is inconsistent with an accurate diagnosis of madness.

A physician connected with one of the largest lunatic hospitals, in his clinical lectures, expressed himself as placed in great difficulty, whenever he treated the subject of *acute insanity*, owing to the infrequent occurrence of so-called *acute* cases. He remarked that they had rather singularly, in their recent visit to the wards met with two or three instances of *acute mania* of unusual aggravation. These were old and confirmed cases, suddenly visited by paroxysms of mania; but with what propriety the term *acute mania*, can be used in such cases, is doubtful, since it refers only to emotional conditions, which are very unmeaning and unimportant; the physical state being at the time strongly marked by *anæmia*; and these cases may be easily known from the pale, sharp, and wild expression of the countenance and features. We observe this state of so-called *acute mania*, most frequently among old and inveterate maniacs; and in cases of epileptic insanity; and also in the varieties of so-called *delirium tremens*, especially when combined with epilepsy.

If the remote causes of insanity be seated in the organs of sense, there is truth in the saying that a madman "has lost or is bereaved of his senses;" but these affections of the senses may be consequences of a condition having no relation to the brain, its membranes, or to the medulla oblongata, but may be referable to functional and organic derangement and disease, and have essentially a reflex character.

We will take a cursory view of some of the more familiar, and emotional manifestations and characteristics of madness, serving for so much as *diagnostic signs* of madness.

The sense of hearing is most commonly affected, not necessarily producing deafness, but with noises and confusion in the head and ears, of a most distressing character, and sometimes attended with considerable pain; and the ears should be carefully examined, and extraneous matters, if present, removed. It may exist, and produce strange delusions for some time before insanity is manifested. At length *tinnitus aurium*, and various noises in the ears become established, inducing delusions.

Electric wires are sometimes imagined to pass through the head; and illusions producing blasphemous, obscene, and exaggerated expressions, are caused through this source of disturbance. The patient frequently imagines that the devil is tempting him by strange noises to destruction. This explains frequent mistakes, which produce irritability and excitement, and which tend to establish illusions, such as fancying invisible enemies, and being haunted by invisible spirits, and noxious reptiles. "A similar example of what may be termed the first stage of insubordination to the will, is that of certain musical sounds coming unsought for upon the mind, and ever tormenting it by their persistence, despite *every effort to put them aside*."[1]

The sight, although not constantly, is commonly affected, and in the same manner as the ear, not by loss of vision, but by objects producing erroneous impressions upon the sight, called *optical illusions*, inducing visions, phantoms, and spectral objects.

The more violent attacks of mania commence with, and

[1] 'Notes and Reflections,' by Henry Holland, M.D., D.C.L.

are accompanied by, the sensation of sparks of fire passing through the eyes, or bright and fiery balls, or other globular objects. These increase as the attack progresses; and the eye becomes preternaturally protruded, and presents a sparkling appearance. These symptoms may probably proceed from excess of arterial action, or other lesion, or diseased change of structure in the central portions of the brain. "A celebrated artist of the present day, whose extraordinary fertility of imagination is a subject of wonder and admiration to every one, remarks that the preposterous figures and faces which he puts forth, always seem to him to exist already on the paper, and that his hand does nothing more than trace the outlines and fix them with the pencil."[1]

Sir Benjamin Brodie relates the following cases:

"A Jewess, who had been for a long time blind, became insane, her illusions were of the sight, and she was constantly haunted by strange visions; after her death it was ascertained that the two optic nerves, from the part at which they are united, within the head (which anatomists call their commissure) to their termination in the *retinæ*, were shrunk and wasted, so that they must have been wholly incapable of performing their functions."[2]

A man met with an "injury of the head, which, as the event proved, occasioned an extensive fracture in the basis of the skull, with such a displacement of bone as to press on the optic nerves, and render them wholly incapable of transmitting impressions to the brain. He was totally blind, otherwise he was not insensible, though he was slow in giving answers, and peevish when disturbed. On the second

[1] Wigan's 'Duality of the Mind.'
[2] Brodie's 'Enquiries,' p. 87.

day after the accident there were manifest symptoms of inflammation of the brain. He was in a state of great excitement, delirious, believing that he saw objects *that did not exist*, and he continued in this state until within a short period of his death."[1]

."I know a person who, amid the din of London streets, occasionally has the perception of his being called by his name, so that he involuntarily turns round to see who calls him."[2] Another case, related by Sir Henry Holland, of a gentleman who, from an accidental blow on the head, seemed better the next day, and able in two days to go out; but, "for the first time, after the accident there came on the singular *lusus* of two voices, seemingly close to his ear in rapid dialogue unconnected with any present occurrence, and almost without meaning."[3] Another man after concussion of the brain . . . . "recovered from the other consequences of the injury, but for a long time *afterwards everything that he ate had a bitter taste*."[4]

"A gentleman who had been under treatment about six months before, for a severe attack of *phrenitis*, and had only been restored by the aid of very active remedies administered by a very judicious practitioner, I afterwards saw in a state which was called perfect recovery. He had for some time resumed his active habits of business, but although considering himself perfectly well, complained confidentially to me, that for some time he had been constantly arguing with himself on an increasing apathy towards his wife, not physical apathy, quite the contrary, it was a strange disin-

[1] Brodie's 'Enquiries,' p. 87.
[2] Ibid., p. 88.
[3] 'Medical Notes and Reflections,' 2d edition, p. 232.
[4] Brodie's 'Enquiries,' p. 88.

clination to be in her society; he found himself frequenting the haunts of his former bachelor state, against his intention, and almost against his will, yet received no gratification from any indulgences they afforded, and constantly harassed by a feeling of remorse for neglecting the society of his wife, whom he had married from choice, whom he respected and thoroughly loved, and who was exceedingly tolerant of his indifference, from a belief that it was caused by pecuniary anxiety. I endeavoured to convince him that it was a moral change, produced by a physical change, and that it would pass away with the consolidation of his health. He remained some time in this state, when he gradually began to see faces in the dark; afterwards in the daylight, groups of faces constantly changing their shape; sometimes a portion of one face would join itself to a portion of another face; sometimes parts of faces, eyes, noses, mouths, cheeks, and foreheads, would float about in vast numbers before him, and from time to time unite themselves in the most fantastic combinations; the whole occupied his mind, and rendered him incapable of continuous attention to any subject of importance requiring deep consideration. A large bleeding and a blister to the nape of the neck immediately restored him to vigorous health, and all his original delight in the society of his amiable and affectionate wife. Such cases are very instructive and should make us slow to judge."[1]

So may the *intellect*, as well as the *senses*, become illuded, and possessed of abstract error, independent and beyond the controul of the will, taking an entire and absorbing possession of it: and this is madness, or so-called *monomania*.

The patient may have been in many instances eccentric previous to the attack of madness; and eccentricity often

[1] 'The Duality of the Mind,' p. 164, by A. L. Wigan, M.D.

remains after a cure has been effected; he is subject to relapse, and appears to be constantly struggling against it. This kind of eccentricity is rarely free from monomania, or so-called, *recurrent insanity*.

Prichard says, that patients labouring under monomania rarely discharge their duties with propriety.[1]

M. Lemel terms monomania "*le délire des passions*," and gives many cases which strongly exemplify Prichard's view.

The patient may be at times free from any hallucination or illusion, and even exhibit strong reasoning faculties; his conduct and manner may be pleasing, and such as to enlist the good will of his neighbours, who may be convinced of his sanity, and even of his mental superiority, until at length his vanity observes no bounds, and after much trouble, and great scandal, his real condition becomes apparent to all; but so long as he remains free from palpable illusion, there may be hope, under judicious treatment and management, of avoiding the necessity for personal restraint, and the delusions will frequently subside when the nervous system becomes strengthened, and the functions of assimilation become improved.

In moral, and what Prichard calls *partial* insanity, the affections are depraved and greatly blunted: even in mild cases, which may rank among cases of eccentricity, and which is unfortunately the lapsed and disregarded interval when treatment would be most successfully interposed, family affections become alienated, and the rules of social life, and ties of kindred are frequently disregarded, although the patient will endeavour to disguise his peculiarities and improprieties.

[1] 'Different Forms of Insanity, in relation to Jurisprudence;' by J. C. Prichard, M.D., &c., p. 16.

Self-exaltation and great vanity, and also humiliation and self-denial, are manifested, according to the state of excitement or depression in which the patient may be. At one time he may fancy himself in possession of wealth, and attract the observation of his neighbours by generosity, liberality, and patronising airs; at another, he is fearful and suspicious of every one he meets, believing that he labours under some remarkable bodily infirmity, or deformity, and that he has committed some crime, for which he may be punished; or is in debt, and in danger of being arrested.

The delusions of such patients are extravagant and curious, they believe themselves kings and emperors, archangels and saints, and even the *Deity*; and most lunatic asylums possess inmates whose impersonations savour strongly of polytheism; and commonly the patient is subject to only one delusion at a time.

Again, the patient will act as though in the enjoyment of vigorous health, and complacently give way to indulgences, gaieties, and dissoluteness; or, when paralysis has made its insidious attack, and *ramollissement* of the brain has commenced, his delusions assume another form, and he imagines himself perhaps the victim of some loathsome disease; or that he has become transformed into some animal, whose habits he imitates: and sometimes his delusions may be of a religious nature, leading him to do penance for imaginary sins. He may be thoroughly harmless in his social intercourse; or, on the other hand, he may make endowments, and perform many ostentatious acts of charity, and bring ruin upon his family by the reckless profusion of his conduct.

Change of fortune, intemperance, a debauched course of life, amatory impressions (especially if attended with any

painful or sudden disturbance of the affections), will produce madness. A man who through life has been remarkable for thrifty, saving, and prudent habits, will become a spendthrift, give dinner parties, indulge in expensive clothing and jewellery, assume the habits and manners of a higher station, indulge in horses and carriages, and attend places of amusement; patronise everything and yield himself to dissolute and debauched habits, travel about in pursuit of novelty and dissipation, and encounter physical fatigue which, under other circumstances, he could not have endured; all the while displaying shrewdness in his calculations, whether in reference to business or pleasure, but entertaining strong prejudices against those who may have interfered to check his course: and freely expressing his opinion of the character, capacity, or wealth of every one within the range of his acquaintance; these are frequently premonitions of *ramollissement* of the brain and of the access of general paralysis.

The intervals between these states of excitement are characterised by a condition of despondency and depression which, periodically occurring, would appear to be a consequence of the long and high excitement under which the incipient lunatic has suffered.[1]

Again, a person of remarkable equanimity, placidity, good sense and taste, after inflammation of the brain, becomes a confirmed lunatic, boisterous, excitable, and full of absurd and ridiculous caprices.

These are familiar emotional manifestations of madness, and for so much, may be considered to be *diagnostic signs* of madness; but can scarcely be considered, or be admitted as pathological signs of madness, or to afford a satisfactory

[1] Esquirol, 'Des Maladies Mentales,' 1838.

diagnosis, in a *pathological* sense: but in every case we shall find the *will*, *memory*, and *understanding*, one or the other more or less compromised.

Predispositions may be traced occasionally to the diseases of infancy; to cranial conformation, or hereditary taint; or to teething, infantile epilepsy; and convulsions. But these explanations are not satisfactory.

Many persons having similar cranial conformations indicating predisposition, and many having insane progenitors, have escaped madness; and others afflicted with epilepsy, convulsions, and even paralysis and hydrocephalus, have survived to become intelligent, useful, and distinguished members of society.

What may be totally incapable of producing disturbance in one constitution, shall overthrow the economy of another. A glass of crude rum, or bad wine may on one occasion induce a paroxysm of insanity; while, in another instance, a quart of the same shall produce no perceptible or injurious influence, especially if in the first instance, there should exist an hereditary tendency, or predisposition, or hysterical complication; or should the patient have had former attacks.

Many cases of hypochondriasis, being of a reflex character, and seated on the functions of organic life, are capable of great mitigation, and of frequent cure, by addressing the treatment to constitutional conditions. The symptoms are visions and delusions, sometimes the patient thinks himself under the influence of witchcraft; at others he dreads bodily injury, or loss of property; and often displays aversion and apprehension of parties most friendly and nearest related to him. In other cases a total loss of volition and sensibility shall be manifested, during which the patient shall

become stolid, obstinate, and impracticable, but in a passive manner.

Many of these cases of insanity, are conditions of debility, resulting from severe, acute, or long-continued chronic disease, commonly of the liver and hepatic system, accompanied with a sluggish action of the absorbents and lymphatics, particularly seated in the course of the spinal axis; the nervous system being exhausted, and also occasionally in a state of congestion: the symptoms are melancholy, hypochondriasis, and great depression; in which alterative doses of calomel, combined with steel medicines, prove invaluable modes of treatment.

Epilepsy, and chorea, are so closely associated with madness, as to obtain a special and family character with it; and catalepsy, may be considered a manifestation of a form of epilepsy.

Hysteria, with its emotional excitements and great sensitiveness, is an approximation to, and very often terminates in confirmed insanity; but assumes frequently a mild and tractable character: and *hysterical*, is more prevalent than any other form of madness.

An aversion or dread of society, is characteristic of madness, and a renewed ability to share in social pursuits and recreations, is almost the first indication of recovery; and social intercourse at that period of convalescence is essential to test, and invigorate the mind.

In the instance of the wild boy of Aveiron, it would appear, that when man is reduced to solitude, before the mind is become expanded, he loses all his human distinctions, habits, and civilisation; particularly in forgetting language, the distinctive manifestation of reason, giving utterance to guttural and monosyllabical exclamations; and

he becomes brutalized, associating familiarly with, and acquiring the habits and instincts, of the wild animals he accidentally meets with.

The seat of madness, may be traced to conditions frequently suspected to exist in the contents of the spinal column. A diseased condition of the spinal envelopes and their contents produces nervous derangement, and often demands attention from the distressing symptoms, indicating either effusion in the *theca,* or other sources of irritation in the vertebral substance. Treatment directed to these objects has been attended with great success; and the conclusion has been confirmed that there is a defective action of the lymphatic and absorbent vessels in the theca, and envelopes of the spinal cord, producing serous effusion within the membranes surrounding the spinal contents; followed by symptoms of *neuralgia, hysteria,* and *hypochondriasis;* and more particularly affecting the functions of organic life.

Any cause which disturbs the nervous system, and excites the functions of the cerebral, or spinal origins of the nerves, such as intestinal irritation from worms, wounds, poisons, loss of blood, sudden and violent distribution of blood to the brain, or epileptical and hysterical seizures, producing convulsions, may cause madness: but *post-mortem* inquiries rarely give evidence of disease in the hemispheres, or in the nervous centres.

And Müller says, "The results of pathological anatomy can, however, never have more than a limited application to the physiology of the brain. We are unacquainted with the laws according to which the different parts of the organ participate in the affections of each other; and we can only in a general way regard as certain that organic diseases in one part of the brain may induce changes in the functions

of other parts; but from these facts, and the results of pathological anatomy, we cannot always draw certain conclusions. Degenerations in the most various parts of the brain, which appear from experiment, to have no immediate connection with the central organs of the sense of vision, nevertheless frequently cause blindness; and at this we must be the less surprised, since, even in diseases of the spinal cord, as tabes dorsalis, imperfect amaurosis is a frequent symptom. The same remark applies to the relation of lesion of the different parts of the brain, to mental diseases; the brains of insane persons frequently presenting degeneration in parts, which are not the essential seat of the intellectual functions.[1]"

On the other hand, we find the uterine, the circulating systems, and the functions of assimilation and digestion most commonly deranged.

Idiocy, fatuity, and the *paralysis of the insane*, are always dependent upon malformation, deficient development, or lesions of the brain, and *medulla oblongata;* and epileptic complications proceed also from the same source.

Dr. Morris, one of the physicians of the York Dispensary, considers that insanity is caused (and many agree with him in that opinion) by irritation of some portion of the brain, and not by inflammation in any case.

Dr. Prichard, in support of the opinion, that the fundamental, primary, and exciting cause of insanity is in many instances to be sought for, not in the brain, but in some other region of the body, gives a case in which the alimentary canal was in a diseased condition.[2]

[1] Müller's 'Physiology,' v. i, p. 838*.

[2] 'Observations on the Connection of Insanity with Diseases in the Organs of Physical Life;' by J. C. Prichard, M.D., &c.

Two cases are related by Pinel, and quoted by Leuret,[1] one of "A patient in the hospital of Bicêtre, who never had any other delusion than that of believing himself to be a victim of the revolution, repeated day and night, in the year 3, that he was ready to submit to his fate; he refused to go to bed, and stretched himself on a damp pavement, which would have deprived him of the use of his limbs. The attendant remonstrated, and employed gentle means, but in vain, and he was obliged to have recourse to restraint. The patient was tied to his bed; but he sought to avenge himself by obstinately refusing to take any kind of food. Exhortations, promises, threats, were alike unavailing. For four days he lived in entire abstinence. He then suffered from extreme thirst, and drank plentifully of cold water, but he refused the *bouillon*, and every other kind of nourishment which was offered him. He became extremely thin, and about the tenth day of this frightful fast, he had the appearance of a skeleton, emitting the most fetid odour from his person. His resolution was as strong as ever, and he confined himself to his ordinary beverage. On the twelfth day the case appeared hopeless, when the superintendent told him that he would be deprived of his cold water if he was not more docile, and then offered him some *bouillon*. After some hesitation the patient drank the beverage with avidity, and received his reward in the free access to cold water. His stomach somewhat restored, he experienced an agreeable sensation, and he consented to take the same evening another basin of *bouillon*. On the following day he partook of rice, soup, and solid food, and by degrees became healthy and robust."

And another, "A monomaniac placed among the incura-

[1] 'Traitement Moral de la Folie,' p. 92.

bles at the Bicêtre, despairing of his position, resolved to starve himself. Three days passed and his resolution was unchanged. I gave him a douche. Having received it, he said, 'Why do you wish me to eat? Is it not better to die than to live in a hospital?' 'You need not be in the hospital. Be reasonable; instead of being sullen and taciturn, come with us, eat, and work, and you shall be placed with the convalescents, and will then soon regain your liberty.' 'My liberty! when will you give it me?' 'In a month.' 'Then I will eat.' He partook of the most solid food with avidity. I placed him with the convalescents, often took him with me to encourage him and sustain his good resolutions; and in a month he was liberated."[1]

These I would consider to be cases of *lacteal starvation*, and by which conditions, the *nervous* unity and co-ordination, as before explained, becoming disturbed, mania and melancholia are induced.

Nothing more clearly shows the functional origin of madness than its observing a periodical character. The designation of *a lunatic* is derived from the periodical character of the malady, and madness has been from a remote date attributed to lunar influence.

Insanity is said to be continued, remittent (or as it is called *recurrent*); and intermittent. In recent insanity, if the intermission be distinctly marked, no cases of fever will more surely give way to medical treatment, or be more certainly succeeded by restored health and strength, under such treatment, than cases of intermitting insanity at their early manifestation, having regard to constitutional habits and peculiarities of mind and body; thus establishing the identity of mental with physical disease: madness being

[1] Leuret, ibid., p. 219.

always traced to functional derangements at its commencement.

But in established conditions of madness, when the nervous system has long been subject to habitual error, the senses become depraved, deficient, and diseased; while in the earlier stages they are only secondarily and partially affected; and at that early period the organic functions of animal life, will be found more often the seats of disease than the nerves. It should be remembered, that it is at this period (the period of the incubation of madness), that the treatment is successful, and if this opportunity was taken proper advantage of, madness would be more frequently cured.

Congenital diseases, or diseases complicated with epilepsy, malformation, or morbid deposits in the cerebral and spinal tissues, must be excepted from this favorable view.

The conditions of insanity, induced by a state of congestion and derangement of the nervous centres of organic life, become amenable to treatment, directed to give force and energy to the lymphatic absorbent and secreting functions. Such are hypochondriasis and melancholia; and the excitement and delirium produced from a variety of opposite causes, some from excessive nervous exhaustion and innutrition, often proceeding from a defective function of the liver, or induced by over-action of the brain.

If the brain be a secreting organ, its peculiar secretions may be interrupted, as we find occurs in other secreting functions, namely, the liver, kidneys, &c.; and the materials which in health it eliminates will be thrown into the general circulation. Thus the *bile* and *urea* are thrown into the circulating fluids, and disease is the consequence; and the seminal fluid may, when in excess, be absorbed into the circulation without any prejudicial influence.

If, from cerebral disease, the nervous fluid be not properly secreted in the brain, and becomes absorbed into the circulating fluids, no doubt it would disturb the vital economy; and it is yet to be ascertained in what way the diseased nervous fluid, secreted in the cerebral mass, if thrown into the circulation, produces derangement and disease of the general system. Or, when in health, if from an excess of nervous fluid, it should become absorbed into the general system, when no disturbance, or disease of the nervous centres, or of the organic functions exist, may it not affect, beneficially, the intellectual, as well as the organic powers?

Any objection to this view, as explained by Mr. Solly, of the *glandular structure of the brain*, has yet to be given.

This is opposed to a view very cogently entertained, which makes the brain vicariously affected; and the seat or proximate cause of madness, to be elsewhere than in the brain. A view which is carried by some to the extent of asserting, that the mind is also seated elsewhere than in the brain, because disease is ascertained to exist in other functions during paroxysms of madness; and when disease cannot be traced or discovered to the cerebral hemispheres or nervous centres.

But whether the brain be a gland or not, in the usual acceptation of the term, it is agreed that it secretes the nervous fluid through the supply of the circulation; that its healthful secretion, and even vitality itself depends upon the integrity of that supply, which is larger in the brain than in any other organ; and that the cerebro-spinal system is more sensible of an impure and vitiated state of the *liquor sanguinis*, and of a deficiency of scarlet or arterious blood, and

of a too great or diminished supply of the circulating fluids, and to interruption of the functions of the heart and vascular system, than are the glands of organic life. This view of the subject helps to place mental diseases within pathological laws.

The word *acute,* in reference to mental disease, implies *paroxysmal exacerbation,* with intensity of moral and emotional expression ; and not as the term is applied in physical diseases, namely, to *pyrexial exacerbation,* and *vascular excitement,* or increased vascular circulation: the *type* of which being the condition of *inflammation,* or an excess of action above healthful life, we may denominate to be a state of *hyperbiosis* ; but it is more often to be attributed to a state of diminished circulation: for in *acute* conditions of mania there exists an *adynamical* and anæmial state of the system ; pale complexion, feeble pulse, cold surface, and slow circulation.

Dr. Conolly relates a case of *acute* insanity, which, after an attack of apoplexy, became greatly improved, the senses very much restored, and violence greatly subdued ; results which would scarcely be anticipated.

VARIETIES OF INSANITY.

The varieties of insanity which may be enumerated are the following, namely, *acute and chronic mania ; intermittent and recurrent insanity ; monomania ; idiocy ; imbecility ; dementia ; melancholia ; and puerperal insanity.*

These are the divisions which Dr. Conolly considers practically requisite: but insanity, with lucid intervals, and also with delusions, occur which cannot always be arranged in the above series: but we must at any rate include epi-

leptic insanity. A few of these varieties will be cursorily alluded to.

Esquirol describes intermittent insanity under the heads of quotidian, tertian, and quartan. Dr. Conolly relates a case of a military man, a major, who was insane one month, and well the month succeeding, and who, being in the habit of reading the daily papers when well, amused himself by reading up those which became in arrear during the month of the insane paroxysm. Intermittent insanity, distinctly marked, is not met with at Hanwell; but a case came under observation of the author, at Bethlehem Hospital, of a female, considered by Sir Alexander Morison to be a well-marked case of intermittent insanity: but the intermittent state most often prevails at the early access of insanity, when the disease is least under the notice of medical men, and frequently when not at all under medical treatment; in short, when the nature of the malady may be said to be scarcely *unmasked*, or, when it may be considered to be in a state of *incubation*.

MANIA.

In giving a history of mania, its affinity with *epilepsy*, is so near, and constant, that we almost imperceptibly trace the features and character of the two conditions at the same time.

In acute mania the powers of language are wonderfully increased. Esquirol says, "the maniac gives utterance to every idea passing through the mind." The sane man could scarcely find language for this; for while attempting to do so his powers of attention and association of ideas would

fail, and he would forget what he was endeavouring to find words to express; but if it were possible for the wisest man to do this, and to have all his ideas and thoughts recorded, it would be a strange and confused picture, and it is questionable if they would appear less insane than if they had proceeded from the wildest maniac.

In acute mania the tongue assumes a white coated appearance as though smeared with *white paint*: the pulse is never under 96, and generally 120: and in convalescence a great tendency to self-destruction exists.

Acute mania is often manifested by demonstrations of violence; also with grimaces, grinning, and all sorts of distortion of the countenance and features, and spitting at every one near; and frequently with tetanic, and opisthotonotic convulsions, and spasms; also with constant motion, jumping, bounding almost like a bird, and moving to and fro; and with climbing, and sudden gyrations of the body, threatening mischief to everything around, and injuries happen most often to the patients themselves by bruises, burns, and blows: and *catalepsy* frequently shall accompany acute mania. If these cases recover, it occurs through profound sleep coming to the rescue.

Acute mania frequently terminates in chronic mania.

Chronic Mania.—In chronic mania the patient shuns the society of his fellow-men, and will be often for a long period in a state of unconsciousness, forgets language, and gives utterance to low guttural mutterings, half sentences, monosyllabical exclamations, and inarticulate sounds and ravings; and sometimes to other strange and unnatural noises; or utters sentences containing a few unmeaning words, and those constantly repeated. The patient when in a state of semi-consciousness covers his eyes with his

hands, and seeks solitude and darkness, or runs into corners, to avoid notice; and when in bed throws the covering over his head, and coils himself round like a ball; and his senses are blunted and changed, manifesting a strange insensibility to cold, and at the same time a morbid sensibility of light, and of taste, feeling, and hearing: and frequently, on recovery from this state a great disposition to *salaciousness* is manifested: hence occurs *satyriasis* and *nymphomania:* and during this state the will, memory, and understanding are in abeyance, if not entirely subjective.

DELIRIUM TREMENS.—DRUNKENNESS.

Dr. Blake[1] evidently confounds nervous irritability, with increased vascular action or excitement. He calls the first stage of *delirium tremens,* or, as he terms the disease, *delirium ebriositatis,* "the cold stage;" the second, or "that of nervous excitement," "the hot fit;" and the sleeping, or third stage, the "sweating stage of intermittent fever."

There no doubt exists in *delirium tremens* a state of intermittent nervous excitement, similar to the case described by Dr. Blake; but it is widely different in its character from intermittent fever, although not so much in the mode of treatment which is indicated: and Dr. Blake concedes as much, when he states, in the next sentence, "I regard it to be altogether of a *nervous nature;*" since intermittent fever is not considered to be essentially of a *nervous nature,* but more nearly allied to the circulating systems, and to the functions of organic life.

[1] 'Practical Treatise on Delirium Tremens,' by Andrew Blake, M.D. 1830.

The strong analogy between *delirium tremens*, and that state of raving madness which is the consequence of inanition, and which characterises the last stage of *mania ferox*, (and which always terminates fatally from *lacteal starvation*, as, in short, do most cases both of drunkenness and *delirium tremens*), and of puerperal mania from loss of blood; or from lochial absorption, or pyœmia, would go far to establish, that it is not always the consequence of indulgence by the drunkard in spirituous liquors, or "habitual abuse of diffusible stimuli," as insisted upon by Dr. Blake.

GENERAL PARALYSIS OF INSANITY.

The *general paralysis* of the insane, is almost peculiar to the male sex, and rarely occurs before thirty years of age. It is brought on sometimes by intemperance, but not generally or frequently so in this country; perhaps it arises more often from the over-exertion of minds not naturally strong enough to sustain much mental exertion.

It is of frequent occurrence from the strain produced by commercial and literary competition, after the resiliency of the brain is exhausted. A fit generally precedes the attack, resembling fainting, succeeded by others, evidently of an *epileptical* form; and in many cases loss of memory follows; and *epilepsy may be considered the type of general paralysis.*

The habits and pursuits of the patient become altered, to a state of great exaltation. Hesitation of the speech, or a lingering utterance is characteristic of these attacks, after they have made some progress, especially after the patient has been talking for some time, when a halting between the syllables is observable, which, although nearly approaching to, is distinguishable from a stutter; at length the speech

becomes guttural, thick, and indistinct, and a difficulty to protrude the tongue occurs, accompanied with a jerking motion in the attempt.

The gait in walking, becomes unsteady and infirm; the patient stands with his legs wide apart, and manifests in walking a peculiar, bouncing movement, slightly noticeable from the commencement of the attack, although he is unconscious of it himself, and it may have passed for a long time unobserved by others. The patient is fond of, and anxious to take, exercise, but in time becomes quite incapable of walking: and upon inquiry an alteration in the gait, in a slight degree, will be found to have existed for many years.

At length complete imbecility is manifested, yet the patient seems always in high spirits, laughing, cheerful, and happy; and may remain in this state for two or three years, indulging in hopeful expressions, and apparently sanguine feelings; his eyes shall be bright, and he shall look flourishing, and sometimes grow fat; he will boast of performing extraordinary undertakings, running races, going to the opera, &c.; and will have occasional paroxysms of violent excitement.

The pupil of one eye shall occasionally be found preternaturally dilated, giving a peculiar expression to the countenance. The patient is almost always unconscious of his condition, and in the last extremity with an enviable equanimity declares himself quite well, and that there is nothing wrong about him.

The excretions are retained, and the *sphincters* act properly to the last, if the patient be well attended to, in *general paralysis.* In common paralysis, with mania, the sphincters generally lose their function, and the muscles

decay, and the exaltation accompanying *general* paralysis is absent; and frequently no excitement shall exist.

A man, at Hanwell, afflicted with general paralysis, and incapable of moving from his chair alone, declared he was quite well, and capable of boxing, or any other athletic exercise, and talked of "raising ladders to heaven," &c.: another case at Hanwell, of a young man, named *Gall*, who acquitted himself creditably in his college exercises, became strange and eccentric in his conduct, laughed on improper occasions, and committed many eccentricities and improprieties; at length his speech became affected: the sphincters, in his case, lost their function, and his gait became infirm, and previous to death the *paralysis was universal.*

Clearness of the mind and intellect will often return previously to death in cases of *general paralysis;* and even *wills* have been made at this last stage of the disease, but with what propriety such an act is permitted is doubtful. These afflictions sometimes continue many years, and assume a paroxysmal character, having long intervals, inducing the belief of their curability; and some cases are recorded to that effect.

Extensive effusions between the *dura mater,* and also beneath the *pia mater,* destroying the convolutions, are frequently discovered, and also general softening, or a *hardening* of the brain, different to those which are discovered in other cases of mania; and also preternatural effusions in the ventricles occur, which are sometimes in these cases enormously distended with serum.

In these cases the memory is generally and early impaired; but the fact that this is not always the case is the more noticeable and extraordinary, from the very extensive lesions of the hemispheres generally discovered, and a living case exemplifying this, has been recently named to the writer.

MELANCHOLIA.

The variety of melancholia, especially noticeable, and to which we shall more particularly refer, is frequently attendant upon uterine disturbance, and prevails both at the commencement and termination of the catamenial function; and generally great constipation accompanies it, with prostration and even *marasmus;* and a tendency to self-destruction often attends this extreme state of uterine irritability; and amongst other hallucinations a state of religious esctacy will sometimes exist.

The digestive functions in these cases are always weak, and the action of the liver is deficient, to which the extreme attenuation so characteristic is no doubt attributable, attended also with a feeble pulse, cold skin, and slow circulation, and the voice is frequently almost inarticulate: these cases have stages of convalescence and relapse.

Large doses of narcotics, namely, of *laudanum* and *henbane,* have been resorted to in the treatment of melancholia, but with uncertain and very doubtful benefit; and if any result is expected of them, it must be by their producing a temporary tranquillity and *sedation,* hoping thereby to accumulate nervous energy, and to produce reaction; but these are rather objectionable and abnormal means, since unfortunately, at the same time, other opposing conditions are induced, namely, *cephalalgia* and *constipation.* After mildly clearing the *primæ viæ* with *rhubarb* and *magnesia,* considering these cases either as conditions of *cachexia,* and administering the salts, or carbonates of iron combined with *chillies, henbane,* and camphor, and also malt and hop drinks as a liquid nourishment, or, as conditions of

dyspepsia, giving attention to the assimilating and digestive functions, have been found, with the aid of a milk diet, the most successful means to effect a cure, assisted by the adoption of out-of-doors exercise by the patient at the earliest moment, and to the greatest extent short of fatigue.

PUERPERAL MANIA.

Puerperal mania is hereditary; and is often unattended with pain, but characterised by a pale, alabaster skin, sharp visage, and a quick pulse (120); and also a state of unconsciousness, amounting to fatuity; and at first, of low delirium, which will progress to a high degree: and nervous excitement may ultimately prove fatal by exhaustion. It is often traced as a cause amongst the poor to a state of *lacteal starvation*, aggravated by the necessary exhaustion attending parturition, or to loss of blood in cachectic habits. It is liable to return in succeeding labours, but is curable under thirty years of age.

In the onset of the treatment, regard should be had to the action of the bowels, and of the skin, followed by mild and easily digestible nourishment; and the *henbane*, in conjunction with *camphor*, and capsicum pepper will be found very useful also in these cases, having always in view the restoration of the *uterine function* to a normal state and for this object small alterative doses of calomel, may be used in conjunction with the other remedies: and under this plan of treatment puerperal mania will often quickly subside.

EPILEPTIC MADNESS.

Epilepsy is hereditary. The epileptical condition always precedes the attack, and does not date its commencement

after, the manifestation of madness. Epilepsy is attended with sudden paroxysms of mania, often very violent and dangerous, and of great ferocity: the attacks made in this state are uncertain and occur without any warning, accompanied with indiscriminate fury towards persons near them, and sometimes are of a murderous tendency. *Where epilepsy exists we must always be prepared for the occurrence of insanity.* On recovery from a paroxysm the patient is unconscious of the preceding attack, and of all its attendant circumstances, and when convinced of their reality expresses grief for the violence he may have committed; and he generally lacerates his tongue during the convulsions, which are frequently attended with grinding of the teeth, or receives injuries by falls, or struggles. These attacks terminate frequently in sudden death, preceded by a state of *epileptical coma*, or unconsciousness.

If the patient can be persuaded to persevere with fortitude in the practice of a judicious and rather abstemious course of regimen, epilepsy is frequently curable, or perhaps more properly speaking is rendered latent. All indulgence, excitement, and excess must be avoided; and much exercise in the open air, with agreeable recreation, should be practised, but no fatigue; and adherence, as much as possible, to *milk* diet, not forbidding digestible, well-cooked animal food once a day, and potatoes only for vegetables, with a moderate quantity of liquid nutriment in the form of malt and hop drinks: but abstinence must be observed from the infusions of *Tea*, especially of *green Tea*, and other *diluent* and enervating fluids, especially if mixed with wine and spirits.

As the constitution becomes developed, the disease will sometimes disappear.

Its modes of attack are various, from *coma*, *fainting*, or

falling, to extreme violence and ferocity accompanying the attack; but the epileptic *shriek* or *wail*, generally commences the attack, followed and sometimes preceded by premonitory peculiarities and warnings, but more frequently without any premonition: sometimes hallucinations of regular accession shall occur previous to an attack; and the paroxysms are frequently periodical in their recurrence. The patient has no consciousness of anything which may have happened, either immediately before, or during the paroxysm.

Medical practice is unsatisfactory in the treatment of epileptical madness: and the rules of health, strictly followed and practised, seem to offer, in many instances, a sufficient and satisfactory substitute; but to accomplish and promote which, medicine may be found necessary and ancillary, especially the administration of steel and quinine in conjunction with out-of-doors exercise.

The following case, related by Dr. Prichard,[1] must be classed as a case of epileptic mania, attended with bulimia.

"Antoine Léger, vine-dresser, an old soldier, was tried before the Assize Court, at Versailles, in 1824. In an extract from his accusation, it is stated that he appeared, from his youth, dull and sullen, loved solitude, and shunned females and boys of his own age. In June, 1823, he fled from his home and concealed himself in a forest, where he lived for weeks, sleeping in a cave and eating wild fruits. He one day caught a rabbit, which he killed and devoured raw. In his lonely abode a desire seized him, according to his own account, to eat human flesh and to drink blood. Seeing one day a little girl near the margin of the wood,

[1] Prichard 'On Different Forms of Insanity,' pp. 104-25.

he seized her, murdered her, sucked her blood, and afterwards buried her body. Three days afterwards he was apprehended; at first he denied the charge and invented absurd stories, but, at length, being confronted with the body and interrogated, he avowed the fact. He afterwards acknowledged with calmness all the horrible details of the accusation—the rape, the mutilation of the genital organs, and the tearing out of the heart. Before the audience his countenance displayed profound apathy, even an air of gaiety and satisfaction; but after hearing the deposition of the mother he was affected and said, with tears, "I am sorry to have deprived her of her daughter; I ask her pardon for it." He then resumed his indifference. In the same state of mind he heard his sentence of death. MM. Esquirol and Gall examined his head; the former discovered morbid adhesions of the pia mater to the brain."

The following, are interesting cases of *hysterical convulsions*, unattended with cerebral derangement and maniacal emotion, but showing a want of co-ordination of the Will.

"A young lady, after a variety of attacks resembling St. Vitus's dance, which were always relieved by cupping on the temples, was affected at the end of two or three years of occasional suffering by violent convulsive movements of the legs and arms, and indeed of the whole body; these convulsions were much increased by touching her, or approaching her with the apparent intention of touching her, there was occasional difficulty in swallowing resembling *hydrophobia*. After lying for an instant she would throw herself by a strange convulsive spring entirely out of bed, and being on the floor, a similar spring would throw her into bed, or to the top of a chest of drawers five feet high:

her mind remained entire, and she could give no other explanation than that the impulse was irresistible. After a time this was succeeded by a rotatory motion of the head, continuing without interruption night and day for several weeks together; and if the head or neck were touched the motion increased to a most extraordinary degree of rapidity. During the attacks she could only sleep in the sitting posture, and the motion continued during sleep, though in a more moderate degree; but if she happened to slip down so that her head touched the pillow it was instantly increased to a frightful degree of rapidity. These paroxysms were relieved by nothing but cupping on the temple to the extent of ten or twelve ounces, when the affection ceased in an instant, with a general convulsive start of the whole body. At the expiration of about four years, it was decided to leave the next attack to nature and attend only to peculiar functions which were in a state of abeyance. In the midst of a violent paroxysm which had lasted three weeks, without any intermission night or day, of the motion of the head, she ceased (as from cupping) with a sudden start, other natural functions were restored and she became perfectly well."[1]

Catalepsy.—A country girl, Elizabeth D—, about sixteen years of age, comely and well grown, was assaulted by a powerful young man, a blacksmith, with criminal intent, which was prevented by her resistance. She fell into a state of *catalepsy*; her arms and hands became extended and rigid; her eyes wide open and fixed, the iris contracted, and face suffused; and her body rigid and erect. She recited a series of words descriptive of the outrage, like an automaton, with

[1] 'Pathological Researches on Diseases of the Brain and Spinal Cord,' by J. Abercrombie, M.D., pp. 151, 428.

an animated and rather plaintive expression, and in language elevated far above the style of her humble station. After going through this recitation with the precision of clock work, she suddenly fell into a cataleptic trance, or a state of ecstacy, muttering at times indistinctly; and from which she became aroused by a return of the paroxysm, which observed precisely the same period of access and duration; and she would recite the same series of words, without addition or omission, her tone and manner observing strict sameness during each attack. She was very feeble and exhausted, and replied to questions in a low and tremulous tone, and in a half-conscious state. A suppression of urine set in, (slight incontinence having occurred at first), and the catheter had to be introduced two or three times daily. As the circulation appeared deficient in the lower extremities and pelvic region, with considerable determination of blood to the head, *thirty drops* of the *spirits of turpentine* were administered, and two or three times repeated at intervals of eight hours, with the object of exciting the hypogastric plexus, and was attended with the best results; it speedily removing the suppression, and all the cataleptical and hysterical symptoms, and in a few days she became restored to perfect health.

PHRENITIS.

Consistent with the views advanced, in these pathological sketches, *phrenitis* must necessarily be included in this discussion, for the reason and upon the grounds of its exclusion by pathologists from the varieties of madness, on account of its being considered essentially a *physical* or *organic disease*, namely, *inflammation of the brain.*

That circumstance of itself recommends it as a *type* to exemplify particularly the diseases of madness: phrenitis *having during its existence all the phenomena and symptoms of madness,* and its exclusion, hitherto must rest upon the gratuitous assumption, that the *brain* is not the *seat of insanity.* The contrary of which may become established, as the progress of pathological investigation advances, namely, that disease during madness, in most instances, may be traceable to the structures of the brain, but which from the delicacy of their organization may baffle detection.

Phrenitis, as an *acute* disease of sudden and present attack, frequently comes under the notice of medical practice, and takes the practitioner by surprise, he being quite unprepared for conditions, which the most familiar with the treatment of madness frequently mistake, from their obscurity. The brain being contained within an inelastic case, constituted of a hard and solid wall of bone, inflammation is induced, and exists in it under anomalous conditions, especially from the nature of its contents, namely, the *cerebral mass* and *sensorium commune;* and presents different phenomena to those which are witnessed in *acute* inflammations of other parts. The disease to which we especially refer, and shall describe, is *idiopathic* (and not *symptomatic*) *phrenitis,* and which is usually and sometimes *rapidly* fatal.

The following case is an example. In 1850, the author was called to attend Major A. M. C—, of robust and vigorous health and constitution, and who had enjoyed a good state of health for a long period previously; he was tall, of ruddy complexion, and intelligent countenance; weight *fourteen stone,* and of firm muscle, although of feeble and childish mind, having been afflicted for some years with

maniacal delusions, but which had become much mitigated for a long time before.

On a *Wednesday* he was quite well, and walked for several hours in the Parks, and died on the following *Friday*. On the attack, he denoted severe pain, obscurely described, all over him, and mostly, as was imagined, referred to the bowels and region of the gall-bladder; in a very short time he could neither talk, swallow, or apparently hear distinctly; his movements became feeble, and involuntarily made, and he was in a state of stupidity and prostration, with frequent vomiting; and the left arm and side became paralysed, and he had no action of the bowels or kidneys, but the sphincters continued their function. No *pyrexia*, or heat were manifested, but coldness of the skin and surface, and rather a feeble and quick pulse; the eyes were injected, and the iris was contracted, but apparently insensible. He showed no emotional expression or excitement, except from physical pain or suffering. It occurred in September, the sun was hot, and he had sat at an open window for some time on several previous days.

The *post-mortem* was made seven days after death,[1] the author being present. The body was very little decomposed, was well formed "and well-nourished; a great quantity of fat being found round all the viscera . . . . upon removing the skull-cap the membranes of the brain were found congested and inflamed, the surface of the more delicate one being covered with purulent lymph, this became very marked indeed towards and upon the base of the brain. Upon cutting into its substance it was found to be soft, but this was evidently the result of decomposition, there was more fluid than natural in the lateral ventricles (which

[1] By Mr. Callaway, whose report is quoted.

might be from the same cause). The *choroid plexus* was pale and covered with small cysts. The heart and lungs were both healthy. The stomach was healthy, and contained some gruel-like fluid. The intestines were healthy, and about the central portion of the *ileum* there was a *diverticulum* of about three inches in length; and at a point somewhat to the left of the *duodenum* there was a *clot* of *effused blood* which had escaped by the rupture of some small neighbouring vein. The liver and kidneys were both healthy, as also appeared to be the rest of the body. There was quite sufficient mischief in the brain and its membranes, to cause and account for death."

This case is especially singular from the very few manifestations of *cerebral* disturbance attending its short progress; but the substance of the brain, when cut into, from its highly-injected state, was of a bright *vermilion*: and the mental functions became entirely prostrated from the first, and although no emotion was manifested the apparent extinction of the mind continued from first to last.

From the state of unconsciousness almost always attending these cases, the usual phenomena of inflammation are not observable, especially the state of rigor is not well marked, or it perhaps may not distinctly occur from the high and continuous *pyrexial* excitement and exacerbation existing.

There is little to guide the *diagnosis* in this disease; the febrile state is slightly marked, as in the case above quoted; the pulse is small and often indistinct; and the superficial circulation so defective that the skin becomes cold, which often induces the administration of stimulants and cordials. The pupils of the eye may become either contracted or dilated, in either case the *iris* is destitute of irritability, but

the eye is sparkling, full, and injected, and the countenance often turged and suffused; and stupidness and obstinacy characterise the attack, it being often regarded as a *moral trait*, instead of the stolidity resulting from compression of the brain.

A young man, of active and vigorous habits, engaged in commercial transactions, shall have business requiring more than usual attention, fatigue, and anxiety, in the pursuit of which he may have to take a long journey at an inclement season of the year, and becomes exposed to damp and fatigue: or a literary man may have an unusual demand made upon his energies; all at once he is noticed to become eccentric and apparently stupid, and also irritable, passionate, and frequently ungovernable and obstinate. Confinement and restraint are necessary; but the disease becomes aggravated unless the most active, depleting treatment, both local and general, be early adopted. Partial paralysis takes place, with constipation and loss of function in the kidneys. The above description is an epitome, or abstract of the cases of William S—, of Birmingham, about twenty-six years of age, and also of that of a literary man. These cases observe great similarity in their symptoms, and one case is the type of many.

Nourishment and cordials are often administered so long as the functions of deglutition continue, and the rigidity of the muscles of the jaw can be overcome, to effect which force is often practised. The apparent prostration, and exhaustion occupies the attention and regard of the practitioner, and unfortunately *depletion* and a *mercurial* treatment are rarely practised, or if so, *too late*; and the disease generally terminates fatally, sometimes accompanied with *tetanus*, and other convulsive symptoms.

But even under the most favorable treatment, if the inflammatory disease be subdued, the turning point, when *exhaustion* sets in, is perhaps as formidable, and dangerous as the original disease.

The few pathological sketches given above are offered as practical reminiscences, rather than as an authoritative discussion of a subject very extensive in its bearings, and deserving of elucidation, but which, at present, is little and not satisfactorily investigated.

It seldom shall happen that a man's character, temperament, or moral habitudes shall remain the same after any great disturbance, or extensive lesion of the organic system; thus, after trephining, concussion of the brain, typhus fever, amputation, or the larger operations, an altered and mischievous influence upon the nervous system is frequently produced, and a material change of character, and, constitution may frequently occur.

Medicinal agents may produce aberration of mind; after procrastinated treatment of acute diseases of the viscera, and the use of powerful depletants, such as bloodletting, digitalis, tartar emetic, aconitum, belladonna, colchicum: (Hyoscyamus is, perhaps, to some extent exempt from this objection, and may be considered not so liable to produce such effects). After secondary diseases, or attacks of acute disease are subdued, particularly should the skin and mucous membranes become affected from mercurial or digitaloid ptyalism, or ulceration, a degree of nervous irritation may supervene which shall amount to, or progress to madness: thus, after smallpox, measles, scarlatina, miliaria, and even after psoriasis or nettle-rash, in irritable constitutions, such sequelæ may occur. The nervous power, from previous extensive superficial or other inflammation of mucous sur-

faces, becomes so far prostrated, that delirium and madness may follow, or effusion in the ventricles from *metastatis* may occur: also when the organic structures of the heart have been the seat of inflammatory action. Schoenlein gives an instance of this in his 'Clinical Lectures,' in the case of a young female, who died of complicated *phrenitis*, with inflammation of the structure of the heart, attended in succession, also with *miliaria;* it had a *metastatic* character, at one time affecting the joints, then the heart, afterwards the skin (miliaria supervening), then the heart again, and lastly terminating in intractable *phrenitis*, a not unfrequent consequence of metastatic inflammation of fibrous structures, or of skin diseases, especially after severe exanthematous fever,[1] in which great congestion of the brain, and of the cerebro-spinal system has occurred.

The reason of diseases of the heart, skin, mucous membranes, and ligaments of joints, being very likely to follow each other in succession, or to exist simultaneously, is, that the same *anatomical* structures are implicated, namely, the fibrous, and fibro-cartilaginous tissues; and the seat of disease being in these particular structures, produces that train of symptoms which characterises the febrile disturbance of *typhus*, in opposition to *synochus*, manifested by the one, in its course progressing to *phlegmon*, and the other to *gangrene*.

The complexion in madness is seldom clear, and often of a cadaverous hue; and the skin is hard and dry, and frequently affected with eruptions, which may perhaps result from negligence and want of cleanliness.

There is another shade of intellectual alienation which

[1] *Autopsy*.—"The brain was neither filled with blood, nor could anything abnormal be found in any part of it." This could not therefore be considered to have been a case of *idiopathic phrenitis*."—(The Author.)

must be reverted to. *Age* produces upon the human mind many influences, both moral and physical; experience, vicissitude, the ills of life and its uncertainties, change the moral affections and sentiments. The conscience and moral feelings become callous, as the sum of good and evil is reckoned up. But while this transition silently takes place, and the mind becomes more opaque, and less sensible of moral influence, and impressions, produced by the physical changes which time is producing upon the nervous centres, and upon the organic textures of the brain, especially of its more delicate organizations, the apoplectic climax occurs, and by its advent life ceases: but these climacteric eccentricities, are manifested to the surprise, and scandal of a more fresh morality, which has not yet been assailed with the continuous assaults of a temptation, which produces mental and moral indifference, obduracy, and insensibility.

Having treated, the *physiology* of the mind, separately from the *pathology*, although Dr. Walshe, and Dr. Bucknill hold that physiology and pathology are not capable of such separation, and Dr. Walshe (who shall speak for himself) very emphatically lays down this doctrine; on again resuming the argument in this place it may be considered, to a certain extent, an admission of, and agreement by the author in that view.

However much *irritation* may be set up, and be induced in the brain, from distant organic and *reflex* causes, acting upon the nervous centres, so as to induce madness; yet on many occasions we are forced by irresistible evidence to admit pathological anatomy, distinctly and independent of physiology, in the usual meaning of the word, to explain some of the most formidable manifestations of madness; and if

not, we must admit *two* physiologies, namely, the physiology of health, and the physiology of disease: and in tracing some of the salient points in the physiology of the mind, we necessarily, at the same time, elucidate some important facts, both pathological as well as physiological.

We have noticed the seat of certain brain functions supposed to be satisfactorily understood, and safely established —thus, that the *cerebrum,* is the seat of mind, in which are elaborated perceptions, ideas, and reason; will, memory, and understanding. That in the *cerebellum,* and central parts of the brain, including the *medulla oblongata,* originate volition, motion, emotion, sensation, and the instinctive functions; and that the *spinal chord* and the sympathetic or ganglionic system are the seats of the organic, vegetative, reflex, and excito-motory functions.

We will, in conclusion, illustrate by a few quotations from M. Müller, and the authorities above referred to, the propositions thus stated, including the supposed uses and relations of the medullary fibres and bundles, and of the gray cortical substance; and also of the commissures, convolutions, and hemispheres to disease; explaining also the duplicate character of the hemispheres.[1]

Dr. Walshe, in his introductory lecture, says, "The body in health and the body in disease is the *same body;* and whilst our knowledge of the phenomena of disease can only be based, like our acquaintance with the phenomena of healthy action, on direct observation, our power of interpretation of that phenomena must depend mainly upon the extent of our acquaintance with the laws of physiology. The two sciences in an enlarged view are in fact one, and in cultivating either separately we are continually treading

[1] See Appendix A.

upon the borders of the other, much more than we may be at first aware."[1]

Müller says, "In what respect the medullary and the gray substance of the hemispheres, differ with regard to function we are quite ignorant. The capacity of the mind in different animals manifestly increases, *pari passu*, with the extension of the surface of the cerebral convolutions; but we have not the slightest knowledge of the nature of the influence exerted by the gray cortical substance, into which the innumerable fibres which pass through the optic thalami, at last radiate. We are ignorant of the nature of the change produced in the medullary fibres, in the cortical substance, or in the principle which animates it, when an idea makes an impression on the highly susceptible substance of this wonderful structure. We know only, that every idea is a permanent, immutable impression in the brain, which may at any moment present itself anew, if the mind be directed to it, if the attention be turned to it; and that it is merely the impossibility of the attention being occupied by many objects simultaneously, that causes each to be forgotten. All these latent ideas must be regarded as impressions on the brain which cannot be effaced. Lesions of the brain may annul a part or all of these ideas. Thus, in such cases, persons have lost their memory for nouns, verbs, or even for the occurrence of certain periods of their life; and the memory thus lost has sometimes returned again.

The effects of lesions of the brain are very different; every cause which disturbs its actions, slowly or suddenly, affects at the same time the mind. Inflammation of the

[1] 'British and Foreign Medico-Chirurgical Review,' v. ix, p. 232, 1850.

brain is never unattended with delirium, and at a late period with stupor; pressure on the cerebrum, whether produced by depressed bone, foreign bodies, serum, blood, or pus, always gives rise to delirium or stupor, according as there is, or is not *irritation* with the pressure. The same causes, according to the seat of their action, frequently abolish the power of voluntary motion or memory; and when the pressure is removed the memory frequently returns; and it has been observed that the chain of thought was immediately resumed at the point where it was interrupted by the injury. Lesion of the cerebral hemispheres in animals gives rise to stupor and loss of memory; and in most lunatics considerable structural changes have taken place in the brain, although in other cases, particularly when the affection is inherited, the changes that have affected the microscopic fibrous texture, cannot be recognised with our imperfect means of investigation and defective knowledge.

It has been said, as an objection to the brain being regarded as the seat of the mind, that very considerable disease has been found affecting *an entire hemisphere* without the mental faculties having suffered: experiments on animals show, however, that even *sudden lesion of one hemisphere only*, does not immediately produce complete stupor, that this effect does not follow *until both are removed;* so that it would appear as if one hemisphere could aid the other, and even compensate for its inaction in the *operations of the mind.*"

Again, he goes on to say, "It appears, with regard to their action in the intellectual functions, that the one hemisphere can perform the office of the other. Cases, at least, have been observed in which permanent disease of one hemisphere has left the mind unimpaired; and Cruveilhier has related a case of atrophy of the entire left half of the cere-

brum in a man forty-two years of age, in which the atrophied hemisphere was only about half as large as the sound one; all its parts, the *crus cerebri, corpus mammillare, thalamus opticus, corpus striatum,* and *lateral ventricle,* being all equally diminished in size, and nevertheless the mind was perfect: the two halves of the cerebellum were nearly equal in size, the right being only a little smaller than the left.

In this case, the right side of the body had been from youth upwards partially paralysed, the man being still able to walk with a stick, and the limbs of the weak side were wasted.

The commissures appear to be the cause of this unity of action of the two hemispheres. The influence of the corpus callosum is not quite certain; yet the presence of the corpus callosum, and fornix would appear, from a case observed by Keil, not to be necessary for the exercise of the lower mental faculties. In a woman whose intellects were dull, but who was nevertheless capable of common occupations, such as going on errands, the parts mentioned were wanting, but the other commissures were present.

The coincidence of idiocy, with destruction of the corpus callosum in chronic hydrocephalus, does not prove any connection between them, the disease being so complicated.

But tumours and hydatids have been found attached to the corpus callosum in idiots; and La Peyronnie observed loss of memory attending lesion of that part of the brain.

Few direct experiments have been instituted with a view to determine the function of the corpus callosum. Sancerotte divided this part in a dog; stupor with violent shaking and hiccough were the result. The animal saw and heard, but had lost the sense of smell and the sensibility of the ears, nose, and muscles. Rolando performed the same experi-

ment on a goat. The animal stood for some time without moving, then became restless, and ran forwards, it was kept two days; by degrees it became feeble, could scarcely rise on its legs, and its whole body trembled and was cold."[1]

Dr. Bucknill says—"Pathological conditions may exist in the white medium, in the cerebellum, corpora striata, and thalami, without affecting the mental functions: sensation, and motion will be affected; but judgement, memory, and emotion will be left intact. . . The seat, not only of the intellectual, but also of the instinctive functions, is in the convolutions of the cerebrum proper, and that the cerebellum and central masses of gray matter are subservient to motions alone, excited either by the decrees of the will, or by impressions upon the nerves of sensation, or upon those of excito-motory action. All these points of difficulty being admitted, the important fact remains, that *diseased conditions which affect the mental functions* must have their *seat in the gray matter of the cerebral convolutions;* and in speaking of the disease of the brain in relation to insanity I wish to be understood as speaking of the cerebral convolutions alone, unless where the contrary is expressed."[2]

The brain and the heart, although different in function and opposite in physical character, are, nevertheless, extemporaneous in origin and extinction, since they date and determine their existence at the same moment of time.

To constitute *vital force* there must always exist the cellular *plasma* of the blood, its purifying filterer the lungs and its impelling centre the heart, with its arterial fibrous tubes. And again, on the other hand, there must exist the vesi-

[1] Müller's 'Physiology,' pp. 835*-6*-7* and 814*-15*. See Appendix A 1.

[2] 'The Asylum Journal of Mental Science,' v. i, pp. 289-90-91.

cular neuric cells of the convolutions, with which that *plasma* comes into contact through the *pia mater* in the gray cineritious matter. And organic changes are always going on in the plasma of the blood, in its fibrous tubes, and in the organs and tissues it supplies and nourishes; and, also, in the vesicular neurine and its nervous secretion.

And changes are also, always occurring in the brain in health, which are normal and specific; and so are also the changes going on in disease abnormal and specific; and both are equally as undeviating as any other permanent laws of nature: but we have not yet discovered in either case material results or products sufficient, satisfactorily to explain and demonstrate life and disease; further than that we know that if we take away the blood element, we at the same moment take away life; and that if we take away the nerve force we also take away life.

Investigations through the microscope have assisted to explain pathological facts; but the life element and the *principle* of *vitality* evades the scrunitizing lens of the object-glass, and in attempting to trace and explain the neuric force in the cells of the cerebral mass—to discover pathological conditions—of what the nucleated brain-cells consist and contain,—Reason its most important elaboration and element, for which alone the formative process of nucleated cell growth in the vesicular neurine was originated in the brain, writes no trace upon its unerring disc. The mind is relieved of labour; and the microscope, discarding conjecture and doubt, forbids rather than encourages ideas, theory, and hypothesis, and regards them as alien and impertinent to the reality of its impressions, which safely demonstrate to its admirers epithelial cell-growths, and the existence of formative exudates.

Yet this materialism, opposed to the *dilettantism* and *spiritualism* prevalent, is masculine and hopeful, being also necessarily opposed to an effete reliance upon chance, nature, and expectation. The creative and expansive germs of the universe will supply the enthusiast in physical and demonstrative inquiry with sufficient materials, and he will find ever before him new organisms and new objects to tax his labours.

High as demonstration is to be valued in the presence of inert and organic matter, nevertheless the luxuriant homesteads radiant of vitality and of mind, the already-reclaimed lands of science and investigation, deserve the regard and high culture which reason can alone confer upon them, and in the presence of which the object-glass is futile and unsatisfactory.

Müller so well treats the subject of the Life Element and Vitality, that extracts in the Appendix from his valuable work on physiology will elucidate this interesting inquiry, so far as discovery has already gone for the purpose of this discussion.[1]

In discussing the subject of Vitality—of organic growth and development, and of the formative process—we are always apprized of the limited nature of human intelligence. Some vital forces are so manifest that they may only be considered *statical forces*, subject to the positive and definite laws of development, growth, and change to which all matter in common is subject; while others again, as the nervous force, is so occult and subtile, as to evade detection, although its existence is as manifest as magnetism, galvanism, gravitation, and electricity.

When we arrive at conditions in vital physics, which we attribute to *dynamical force*, the question is, whether

[1] *Vide* Appendix A.

velocity does not impede and prevent the demonstration of ponderability? the impetus of the nerve force being so great, and manifested in a medium so difficult to test it, that its gravity is incapable of being measured or ascertained. Vital physics notwithstanding are governed by the laws of staticks and gravitation, which give to them in their manifestation and development, simplicity, unity, and precision.[1]

Nerve force is so certain and definite, that it obtains in its normal state the character of a *statick force*, its manifestations being as well ascertained as those of other statick forces; but in its *abnormal state* this certainty and precision is lost (which serves to show, as before remarked, the existence of two physiologies—the physiology of health and the physiology of disease), and the evidences which madness, epilepsy, convulsions, neuralgia, and catalepsy, give of *malignant nerve force*, show that its properties cannot be defined in the condition of disease, during which it manifests an eccentric force, parallel and similar to the changes of *malignant organic growths*, and which assume eccentric forms of development different from healthful growth, propagated nevertheless in nucleated vesicles or cells, of disc-like, or oval form, containing nuclei and nucleoli; and a peculiar *blastema*,[2] which characterise also healthful growth.

The ganglionic, sympathetic, and cerebro-spinal systems, like the cerebral, are characterised, in their organical structure, by medullary fasciculi, fibrous bundles, and coils; and also by a gray cineritious matter, and nucleated cells; but *more especially by the ganglionic globules*.[3] The ganglia, coils, and plexuses, form nervous magazines, or batteries, to

[1] *Vide* Appendix B.
[2] Ibid., C.
[3] Ibid., D.

generate and accumulate *nerve force;* and the gray organic fibres are found to accompany the sentient fibres, which intermix with and constitute the sympathetic ganglia, and subserve to their concentric and peripheral distribution, perhaps as well as to their organic functions.

We come to the conclusion, that the *nisus formativus*, vitality, growth, and development, are the results of a statical force, in which the nerve force and the blood system have an equal share.

The *cell-type* prevails in the blood system as well as in the nerve system, and contains the *nisus formativus* of animal (and also of vegetable organization,) both systems having circular or oval vesicles, and nucleated cells with globules, and the nucleoli, so named by Valentin, which form a continuous arrangement of circles in the organization of the animal system, and produce vegetative vital force.[1]

Thus—

The Excitants *of life, development and growth, are—*

1st. *Air, (or water containing air), moisture, and warmth;*[2] *which originate the blood (or its blastema);*

The Apparatus, *necessary to life, development, and growth, is—*

2d. *The nucleated vesicles, or cells containing the* blastema *of the blood, which is impelled and agitated by the fibrous heart and arteries, and purified, and calorified, and rendered arterial by the lungs.*

And, lastly—

The Supporters *of life, development, and growth, are, Food and Nourishment.*

Arterial blood is necessary to the brain, to excite mind nerve force, but *venous* blood will suffice for mere organic

[1] *Vide* Appendix D. [2] Ibid. E.

vegetative growth, and to that extent and for that purpose may possess a limited power of nutrition.[1]

The *nisus formativus*, and *nerve force*, are simultaneous in their existence and in their termination; and the manifest results, so far as organic and vegetative life is concerned, are, nutrition, circulation, and secretion; and the production of chemical changes in the functions of the body.[2]

We thus see that, with pre-existence of the life element, the Senses are the excitants of the *Mind Nerve force;* and that Air, Warmth, and Moisture (which evolve the *blastema* of the blood), are the excitants of the Cerebro-spinal, Sympathetic, and Ganglionic Nerve forces; and which, as they include the organic vegetative system, might properly be called *systemic:* and this systemic nerve force, thus excited and impelled through medullary fibres, and fibrous tubes, and passing through plexuses and ganglia, containing nucleated cells, gray cineritious matter, and ganglionic globules, gives origin to circulation, respiration, secretion, and nutrition, and to all organic and vegetative functions.

Thus by the quotations made in the Appendix, which relate the experiments of Müller, Valentin, Remak, Retzius, Reil, Mayo, Giltay, Van Deen, Magendie, and others, and the deductions derived from the consentaneity of the cerebral, organic, vegetative, and sentient nerve forces, and the necessity of their integral existence, is fully established and demonstrated in the human economy, which shows a more perfect organization, and development, than any other form of vital economy of which we know.

In conclusion, we trace the similarity existing between the kindred science of the *Imponderable Bodies* (so called Physical Forces), with Nerve Force and Vitality; and we

[1] *Vide* Appendix F. [2] Ibid. G.

find analogies worthy of remark; thus, we have *positive and negative electricity, magnetism, electro-magnetism,* and *magneto-electricity:* and we find corresponding, though different results in the Vital Forces, namely, we have Mind *nerve force, Sentient, Motor,* and *Excito-motor nerve force;* as also the *Sympathetic and Ganglionic nerve forces,* (which include the *organic and vegetative.*)

The phenomena of the vital, and physical forces are both equally admirable,—thus light, heat, combustion, chemical action, magnetism, attraction, and repulsion (including *gravitation*), result through the agency of the *Imponderable bodies,* or so called *Physical Forces:* and, on the other hand, reason, intellect, mind, instinct, growth, development, *and immortality,* commence with, and date their existence from the manifestation of Mind, and Systemic *Nerve* forces. The modes of action, in the one, as in the other of these two great sources of power, are equally occult, inexplicable, and obscure, as they are definite, positive, and unerring.

By interposing a slightly saline liquid, or moisture containing a dilute acid, between two metallic plates, connected by another metal, or connected by themselves, intermediately, we evolve or excite these admirable physical phenomena; and which can be manifested by similar agencies, induced by different modes and forms of excitement, as explained by Sir Michael Farady, in his 'Experimental Researches on Electricity,' and by Mr. Grove, on 'The Correlation of Physical Forces,' so as to produce various, though corresponding phenomena.

So, in the Phenomenon of Vitality, the vital element becomes excited on the interposition, or access of "air (or water containing air), warmth, and moisture" through the medium, or intervention of organic cells, of an oval or

circular form, containing nuclei, nucleoli, and globules. And upon this *pre-existent* condition, the Mind Nerve Force becomes excited also through the senses, in other nucleated vesicular cells, which contain a gray cineritious *neuric* matter, and which convey external impressions, impelled by medullary bundles of white tubular fibres, and which excite in these cells, ideas and perceptions; and thus *complete a sensorial circuit by the induction of* WILL, MEMORY, *and* UNDERSTANDING.

Müller further says, "With regard to the 'faculties' set down by Gall, a part of which are totally unpsychological, we may at once exclude from the forum of scientific researches these arbitrary dogmas, which can never be proved. The remark made by Napoleon to Las Casas, with reference to Gall's system of phrenology, is very interesting: 'He ascribes,' said Napoleon, 'to certain prominences, propensities and crimes which do not exist in nature, but are the growth of society, and are merely conventional. What would the organ of theft effect, if there were no property; the organ of drunkenness, if there were no spirituous liquors; or the organ of ambition, if there were no society?'" Gall's system includes no organ of drunkenness, but still the remark is consistent as far as regards the bad psychological foundation of the organ marked out by Gall. "It does not, however, overturn the principle of phrenology, but only the mode in which it is carried out."[1]

[1] Müller's 'Physiology,' p. 836*.

LEGAL VIEW OF INSANITY.

THE enjoyment of the faculty of reason is alloyed, and subdued by the parallel existence of madness, or a condition more nearly allied to madness than to reason, and which we should have had no ability to discern, if the higher condition had not been bestowed peculiarly upon the human economy, by which it is enabled to compare reason with madness. Nevertheless, we are not qualified by this privilege to comprehend a more exalted economy than our own, or any principle that may exist superior to human intelligence; but of the existence of which we have notwithstanding an innate consciousness, confirmed by divine revelation, and by the universal laws of the creation.

Reason cannot be measured under any circumstances by an elevated standard, and legal authorities have defined it with great *latitude;* and it is often defined by the Courts in Civil Inquisitions, at a low measure; while, in criminal cases, a rather high standard is demanded, before the limit of reason is passed, and the existence of madness is admitted.

The difficulty of distinguishing insanity from crime consists in this, that the *moral faculty* is more or less deteriorated in every form of madness.

The varieties of madness, connected with criminal and immoral acts, are usually denominated *Kleptomania, Pyro-*

mania, Homicidal and *Suicidal madness,* and *Somnambulism;* the last gives criminal acts resulting from the function of *volition* being active, without government of the will, or consciousness being asleep and volition awake: and in these varieties madness becomes vice, or error without criminality.

In all cases of madness, responsibility ceases. It is therefore important to know what constitutes *irresponsibility.* "Prove a man to be insane upon any one point, and you forthwith place him in the position of irresponsibleness upon all."[1]

Upon the two conditions of *delusions* and *lucid intervals,* which are important questions to be solved, both with the physiologist and the jurist, great difference of opinion exists, and very opposite conclusions have been given, as to the extent to which each of them confers *irresponsibility;* and one of our greatest and venerable living authorities, Lord Lyndhurst, has by a wise legal *dictum* and ruling solved this difficult and disputed problem.

Commissions of lunacy define precisely, and to a day, the period from which the lunatic becomes incapable to control and conduct his affairs; and no insanity is better understood than is civil lunacy decided by commission; and we advocate that this mode of decision should be extended, to the determining certain acts and circumstances, in which responsibility may be considered to exist, and to be exercised in criminal madness: and also, *if under any circumstances lucid intervals may be pleaded as conferring responsibility* in criminal cases.

To arraign a lunatic at the bar of a criminal tribunal is a sad mistake and mockery, and is as unjustifiable as it is unnecessary; and this phase of human frailty should always excite sympathy, and be screened from exposure.

[1] Charge by Justice Bramwell.

In *homicidal* insanity and *monomania*, all antecedent, as well as present circumstances should be inquired into, and *delusion* is almost always manifested in these cases, which gives to them a definite and less doubtful character; and we discover in the course of our experience that the *unreasoning* condition, if it be the most apparent, is not always the most important manifestation of madness.

On the other hand there are many cases of mental peculiarity, improperly considered to be cases of madness, and we ought not, and cannot limit and forbid the *idiosyncrasy of the human mind.* If every one who has not reasoning powers, who is illogical, or who takes an unusual, or unaccepted view of any fact, is to be considered *mad*, society would become a large infirmary, and great injustice would result.

Delusion, illusion, and *lucid intervals* will be examined, and the first, and last, considered in relation to the legal view of insanity.

Delusions are of an ideal character manifested by speech, impersonation, or other actions, and are not always revealed, for patients possess the power of concealing delusions.

Dr. Barnes, in his evidence in Mrs. Cummings' case (in the trial before Lord Campbell, in 1847), said that delusion was "a belief in things that did not exist, and the drawing wrong inferences from them. To labour under a delusion indicated a diseased mind or judgment; but a person so affected was not necessarily insane. All persons were under some sort of delusion or other." And again, "Delusions were no test of insanity; an obvious impairment of the reasoning faculties and of the mind generally were indications of insanity."[1]

Dr. Conolly says, in his evidence in the same case, "Delusions might often be called mere errors of judgment."[2]

[1] 'The Times,' 1847. [2] Ibid.

Delusion being an *ideal* conviction, is derived from consciousness acting upon its own suggestions, and not from external impressions; and the deluded person, not being governed by reason, or amenable to any logical explanation or demonstration, often becomes the victim of his delusion, and it may prove dangerous to himself and to society, if during its existence the functions of *will* and *memory* be deficient.

There is a difference between *delusion*, and *illusion*, which difference is, that the latter principally has reference to objects which, if they existed and were *real*, would be *material*, and *tangible* objects, and not like delusions, *imaginary* or *ideal;* and illusions proceed from diseased sensations and perceptions; and the patient believes in the *illusions*, but he never appeals to facts to explain their reality and materiality.

Delusion, on the other hand, is ideal or mental, and proceeds from the operation of consciousness acting upon itself through a circle of erroneous ideas and not upon external, material, and tangible objects, and is often sustained by *reasoning;* which is not the case with *illusion:* the reasoning and the chain of erroneous ideas in the one condition (delusion), and the simple mentioning of or referring to the illusion, in the other instance, explains the difference between them: illusion being a passing diseased perception or impression, while delusion is ideal, specious, and more enduring in its character.

Illusions are manifested in the form of visions, and are called optical or spectral illusions, or from a diseased sense of hearing, and result from false perceptions, such as seeing noxious reptiles crawling about; and other animals and phantoms, apparitions, and spectres (which are illusions under all circumstances, whether connected with madness

or not); but insane illusions are attended with *mania* and *delirium*, and are always fully revealed, which is not the case with those who labour under delusion: in delusion, mania and delirium are not frequent, and do not essentially occur.

Illusion, implies a palpable and confessed error, upon which there can exist no doubt; but delusion may, on the contrary, imply error, and also fraud, deceit, subtilty, and artifice; and delusion is easily feigned; and there always lingers doubt as to its existence, since neither mania nor delirium necessarily attend, or form a part to confirm that it is mad delusion; and delusions may exist to almost any extent or degree, without the presence of insanity, since it implies no disease, or madness, unless acted upon, but, on the contrary, rather strength of mind, if its impulses be resisted.

Delusion, as we have before stated, is essentially *ideal*, and mental, and frequently *not* expressed or revealed. If the delusion be *acted upon* it is *insanity*, and the erroneous impression is seldom eradicated or removed, even after convalescence and recovery. Pritchard says, "The true evidence, the test of this absence or presence of insanity, where there is no *frenzy* or *raving madness*, seems to be the absence or presence of what is used in a certain term, namely *delusion*."[1]

"Illusions and hallucinations of the senses are among the most remarkable of the traits of monomania. In these cases the person affected fancies that he sees, hears, or feels, and that he has actual sensations and perceptions of something not really existing. This class of disorders have been carefully described by M. Esquirol, who made the phe-

[1] 'Insanity in Relation to Jurisprudence,' p. 42.

nomena connected with them the subject of a particular treatise. It has been clearly proved by this writer that such erroneous impressions generally take their rise in morbid, bodily sensations. Thus in a woman who had, during her life, declared that she was pregnant by the devil, the womb was found after death to be full of hydatids. Another, in the *Salpétrière*, imagined that a regiment of soldiers were fighting in her belly; a third, that the Apostles and Evangelists had taken up their abode in her body. In both these cases the intestines were found agglutinated together in consequence of chronic inflammation. Many, who have a dislike to take food, and those who labour under chronic pains in the stomach, fancy that they are poisoned. The most frequent morbid sensation is an illusion referring to the sense of hearing. The patient perseveringly declares that he hears and sees something which it is impossible to hear, such as distant voices, as of persons speaking at a distance. An insane clergyman, whom I have lately seen, told me that he distinctly heard the voice of the Bishop of Calcutta, and refused to eat unless the bishop told him to take food."[1]

He also says, "Insanity affects the moral character even more decidedly than the understanding," which is displayed by *delusion*.[2]

Haslam[3] and Mayo both quote the case of Nicolai, of Berlin, to elucidate the subjects of delusion, illusion, and phantasm, and of the existence of delusion in a passive state in the imagination, without influencing the conduct, or being acted upon. A phantom for some time appeared to

[1] Pritchard, 'On the Different Forms of Insanity,' p. 70.
[2] 'Insanity in Relation to Jurisprudence,' p. 17.
[3] See Haslam's 'Medical Jurisprudence—Insanity,' pp. 25, 26.

Nicolai daily, and apparently addressed him; but he was all the while conscious that it was a delusion. Haslam says, had he believed in the existence of phantoms, and acted upon the belief (which he did not), he would have been deemed insane.[1]

Nicolai's case is too long to be quoted here, but shall be inserted in the Appendix.

The following are cases of delusion:

"A man, named William Thomas, a baker, underwent a private examination, on Monday, before two magistrates acting for the Bridgewater division of the county of Somerset, and the result was his committal to Wells Lunatic Asylum, the magistrates being perfectly convinced that he is insane. Various circumstances were mentioned indicative of the man's insanity, and evidence given of allegations on his part that he had had interviews with angels, and that he feared mischief from evil spirits. The immediate cause of the investigation, however, was the fact that Thomas recently wrote a letter to Prince Albert, dictated, as he alleged, by Jehovah's angels, in which he requested the Prince to pay him £30,000. Thomas described himself, when before the magistrates, as William the Lion, the Lord's chief son; and in his letter to Prince Albert he calls his Royal Highness his divine brother. The lunatic asserted that the angels had induced him to claim the money from the Prince."

The condition thus manifested is different from *illusion*, since the man Thomas possessed consciousness, was free from *mania* and from *delirium*, and *reasoned* from a sustained

[1] Vide Mayo, 'Outlines of Physiology, p. 213 et seq., quoted from Hibbert's work 'On the Philosophy of Apparitions.'

chain of erroneous impressions and *ideas*, and acted upon them.[1]

A man, named John Blackwell, of Wokingham, about twenty-five, a shoemaker, residing with his grandfather, in Rose-street, committed a murder, under the influence of mental delusion upon religious matters.

"It appears that during the war in the Crimea, Blackwell enrolled himself in the Berkshire militia, volunteered for foreign service, and went out with the regiment to Corfu, where he remained until after the termination of the war. The regiment was recalled, and he returned to England, from which time he has resided in Wokingham, and obtained subsistence by occasionally working at his trade. He has been of a strongly religious turn of mind, and has diligently applied himself to the study of Scripture. It became apparent that his mind was gradually giving way, and so marked of late had been the change in his conduct that it was feared he would either lay violent hands upon himself, or do injury to persons near whom he was residing. The parish authorities had been made acquainted with the fact of the mental derangement of Blackwell, and, though they had not placed him under restraint, they caused him to be watched, until the necessary forms had been gone through to obtain an order from the magistrates for his removal as a pauper lunatic to the asylum at Littlemore, near Oxford.

"In consequence of his being in such a disordered state of mind it was arranged that Thomas Rance should sleep with Blackwell on Wednesday night, and he arrived at the house of Blackwell's grandfather about 10 o'clock. There were two men, named Mills and White, in the house at the

[1] 'Times' police reports, April 5th, 1856.

time, and when Rance entered the door Blackwell asked him if he was come to sleep with him, and he answered, 'Yes, I am.' As White lived in the house on one side of old Blackwell's cottage, and Mills on the other, Rance told them on their leaving that if anything happened in the night he would knock loudly against the wall. Soon after midnight Mills and his wife, occupying the adjoining cottage, were aroused by a loud noise as of some one calling. He hastened down stairs, and looked out of doors, but could not ascertain whence the noise came. In a little time he heard a scuffling noise round the corner of the next house, by Blackwell's backdoor, and on hastening thither he saw Blackwall standing over Rance, who was lying on the bricks, quite dead, and he said, 'There, I've murdered my conqueror.' Both Blackwell and Rance wore only a shirt, and were besmeared with blood. The wild and ferocious manner of Blackwell so much alarmed Mills that he ran back into his house and fastened the door, for fear of mischief being done him by the maniac. He had scarcely made his door secure when Blackwell arrived, and asked to be let in, calling out loudly, 'I've killed the Devil; I'm the King of Kings.' Blackwell after a time walked away, and Mills, having dressed himself, went out of doors, and with a man named Patey proceeded to the back of Blackwell's house. A man named Frankum had been attracted to the spot in the mean time by the noise, and saw Blackwell in his shirt, with something round his neck. Blackwell, when he saw Frankum, exclaimed, 'I am the conqueror—I have killed the Devil, and there he lies bleeding in his gore; now I shall go to glory.' Frankum then put his hand on Blackwell's shoulder, and said, 'Who have you been serving so?' and the answer he gave was, 'The Devil,

the Devil!' Blackwell then walked away, having only his shirt on, and returned after a long absence. He came and knelt down in front of the house, and began praying in a very incoherent manner. The body of the unfortunate man Rance was removed, and near where it was found was picked up a large knife, with which the deed had been perpetrated.

"Two police officers were made acquainted with the fact a little before one o'clock this morning, but when they went to the house they could not find Blackwell. They made a minute examination of the place, and it appeared that Blackwell and his unfortunate keeper slept together in the room on the ground-floor facing the street; here it was evident the struggle commenced, for spots of blood were found on the bed and on the floor leading to the back kitchen, the door of which Rance succeeded in opening, when he received a blow which struck him to the ground and rendered him powerless. Immediately afterwards Blackwell settled the fate of his victim by making a wound across the neck about two inches long, and passing through the superficial and deep muscles to the spine of the vertebræ. He appeared to have died without further struggle.

"The police officers continued to wait in the house, and a little before 3 o'clock, a noise being heard in the street, they went out and found Blackwell kneeling on the ground and praying. He was then secured, and after he was dressed he was removed to the police station by Superintendent Bostock, of the Berks constabulary. When he was told the nature of the charge, he said, 'I could kill you all, but I have done enough.' He was removed to a cell, and when visited an hour or more afterwards by the superintendent, he said, 'Sir, I'm no murderer. God has told me

graciously, in answer to prayer, that when I struck Rance I was not conscious at the time.'

"At a later part of the day the prisoner Blackwell was taken before Mr. Dalley, the chief magistrate of the town, and underwent an examination. Four persons were examined, and their evidence was a confirmation of the facts above related. At the conclusion of the examination of witnesses, Blackwell, who appeared very wild and excited, said, 'I am charged with wilful murder. I thank my Lord the King of Kings, and founder of the world, whom I have served, that He has freed my conscience from any guilt. He (meaning Rance) volunteered to sleep with me as my protector, and wished me to sleep on. When I had certain evidences in my mind that eternity was coming; what, thought I, sleep on! I got out of bed once or twice, and he pulled me in. He said, 'Don't you feel warm?' I said, 'I don't feel everlastingly warm.' I got out of bed, and could scarcely forbear striking him. I said, 'You devil.' I had had that presentiment on my mind that he was a devil on earth. I thought he was lying in the presence of the 'Prince of Peace and the Son of Righteousness'—that is in Jeremiah. Well, I struck him a blow which almost levelled him to the ground, and the second did quite. I then got a knife and ran after him, and caught him just as he got open the back door, and I then struck him in the neck. The knife did not cut, and I managed to hag and jag away at it until I done the job.

"The prisoner was then committed for trial at the assizes."[1]

The patient's reasoning faculty may be consecutive in

[1] 'The Times,' May 15th, 1857.

respect of his delusion; that is, he may reason conclusively upon it: or he may have a defective *memory*, in which case the *will* having no control over his acts he will put his delusions into practice and become decidedly mad. During the existence of delusions, the judgment, memory, and will, are very often impaired. But delusions and delirium are not usually and not necessarily connected; consciousness existing with the former, but not with the latter: and even *sanity* may exist with delusion, and which is elucidated by Nicolai's case.

In *delirium* the thoughts and ideas are incoherent and rapid, being uttered mechanically and *unconsciously*, and without control of the *will;* yet they are often consecutive and generally unattended by delusions, but frequently accompanied with *illusion*.

A clergyman in orders, Rev. W. B—, at one time the curate and friend of the celebrated and learned Dr. Parr, of Hatton, about forty-four years of age, committed homicide, by discharging two pistols at, and killing his servant-maid; under the double delusion that she was stealing papers from his writing desk, and that he was fully authorized to kill her for so doing. On his trial he was acquitted as a lunatic, and at first committed to jail; he was next removed to the custody of a private asylum. His case was a bad one, being afflicted with every variety and degree of maniacal frenzy, with lucid periods of short duration, when his animal spirits and enjoyments were keen and boisterous. His person was remarkably athletic, being of a large and powerful frame, and imposing presence, and of an exalted and proud mind.

The writer, who had frequently seen John Kemble in the character of King Lear, was forcibly impressed with the

similarity of his acting in the ravings of the mad king, to the emotional impersonations which this patient displayed in his periodical paroxysms.

After fourteen years' confinement, the writer found him in a miserable state, chained hands and feet, and again chained to a block let into the ground of his apartment, which block was his seat; his person covered with human filth, and without clothing to hide his person, as he constantly destroyed it. The apartment without fire, and in the most filthy state; the casement not glazed, nor protected in any other way from the external atmosphere, yet the effluvium from it was intolerable. His dormitory was equally miserable, and he was chained hands and feet, in a doubled posture, to his bed-truck at night, the framework of it being rotten from his secretions.

He had indulged for a long period a personal contempt for his superintendent, which may explain the excessive fear which existed on the one hand, and which no doubt prompted such severe and unjustifiable treatment on the other. He was at this period a fearful and extraordinary object, and it was considered impracticable to ameliorate his condition, on account of his mischievous and destructive propensities, combined with his personal strength, unconquerable temper, and courage; and his violent maniacal paroxysms rendered it apparently dangerous to mitigate his confinement, or to remove his fetters. But the writer discovered in his first interview, a *bonhomie* and generosity which, being appealed to, would aid the endeavour to emancipate him, at any rate, from fetters and filth. And forthwith, every vestige and symbol of his bondage and savage condition were destroyed, restoring his apartment to comfort; and as fast as he destroyed anything, or broke

his windows, they were restored, which made him refrain from such extreme mischief: and, on an early opportunity, the writer took him a retired walk of several miles in a lonely country, without any personal restraint; and as he had never had liberty from confinement for many years, his feelings improved, and all the pleasing incidents of his earlier and happier life returned to his mind, and he kneeled in the snow, which was on the ground, and prayed, shedding tears abundantly. From this time his entire confidence was obtained, and a decided improvement in his condition occurred.

He had been a lunatic from infancy, and his vices were those of madness; he was not revengeful nor ungrateful, but very often a frenzied and violent maniac.

He went for a considerable time regularly to the parish church, by his own wish, when a clergyman arrived whose doctrine was repugnant to him, and after hearing him, he became melancholy and maniacal. Once, for six months in succession, he conducted himself in a gentlemanly and proper manner.

His paroxysms manifested every variety of madness. He amused himself with reading; took much interest in the daily papers, and letter writing, and was fond of music. He visited the country residences in the neighbourhood, and frequently talked of them with delight. He required very little personal restraint, except occasional seclusion during his paroxysms of maniacal melancholy, when, during his mental prostration, he scarcely uttered a word but incoherent and disjointed mutterings.

On the access of each paroxysm of mania, he would repeat cogently and consecutively the incidents connected

with the perpetration of the homicide, and his view of it, defending the act, in an excited and irascible manner.

In his case, no refined feelings interposed to render it difficult to cater for his recreation and amusement. His pride was not of a moral quality; it was an acquired habit, derived from associations, education, and station, no doubt much subdued by the associates he might have encountered in jail. In short, his was conventional pride; and so long as the prestige of his being a Master of Arts at Oxford, and the privilege he claimed of being a *Doctor of Laws*, were conceded to him—an idea which afforded him much gratification—he would derive amusement, and pleasure, from almost any not unsociable companions.

This patient lived to be 72 years of age, and was in good bodily health till a very few days previous to his death, (although he had been confined for so many years, and had suffered from severe accidents from recklessly climbing and scaling walls), which was induced by a severe influenza through his indifference and carelessness. Notwithstanding the degraded situation of this lunatic, from having acquired bad and dirty habits, and from long paroxysms of aberration, and complete mental darkness, and privation of all intellect and reason, his early habits and associations were not disregarded in the arrangements made for him, and in the amusements afforded him, in which he took a lively interest; and he was particularly gratified in attending the services of the parish church, and by reading aloud the services of the Church of England.[1]

[1] The following quotation from the 'Warwick Advertiser,' relates an incident of a curious nature connected with the case of this lunatic. It is headed as follows:

"*Singular Fact—Bellingham, the Murderer of Mr. Perceval.*—In our obituary of the present week we have recorded the death of the Rev.

Delusion is only a link in the chain to prove the existence of insanity; and, if received as evidence, it must be supported by physiological and pathological conditions. In 1849, Lord Denman rejected a plea of insanity on the express ground that no delusion had been proved, stating that the maintenance of such a plea was "a presumption of knowledge which none but the Great Creator himself could possess." But in 1850, in the case of "Bainbridge *v.* Bainbridge," Lord Campbell pronounced a different judgment, declaring that "there may be mania without delusion;" which was confirmed by Mr. Justice Maule in the case of "Overstone." If delusions, unconnected with physiological or pathological evidence, be admitted to confer irresponsibility for crime, serious errors may be committed, since delusions are easily simulated.

Lord Erskine's view, *that delusion, when traceable to the commission of a criminal act, confers irresponsibility*, was not admitted by the courts in which it was urged at the time, although more favorably accepted in the present day; and he was the first to advance this view in his eloquent address to the jury in defence of Hadfield, for firing at George III, at Drury Lane Theatre. But as a plea for insanity, it is open to the following objections.—If delusions traced to the commission of a criminal act, be accepted as evidence of madness, and admitted in extenuation of crime, the delusions

W. Brooke, by whom a servant-girl was shot in this town, in the year 1812. On this occasion we have been reminded of the striking fact, that Bellingham, who was staying in Warwick at the time, was an eye-witness of the death of the unfortunate servant, and expressed the utmost horror at the act by which she was destroyed. Little was it then expected by those who heard him, and perhaps as little intended by himself, that he would, even in a few days afterwards, become the assassin of a Minister of State."

should have existed as in Hadfield's case, before the crime was committed, and cannot be first discovered to screen, or be *extemporised*, expressly in mitigation of crime, as they would have equally existed, and most probably would have been detected, if the crime had never been committed. Especially is this necessary, as delusion by simulation may be used as a *cloak* for the commission of crime.

In Hadfield's case, wounds in the head, of a complicated and violent kind, from the effects of which he had for a long period suffered under delusions, and homicidal tendencies, rendered the plea urged in his defence by Lord Erskine, of "delusions traceable to the act" not essential to the issue, since better evidence existed of their being referable to physiological and pathological conditions, the best, and perhaps the only, evidences of insanity that can be relied on, and it manifests in how slight estimation was *physiology* in that day, that these evidences were not urged, or even reverted to in Hadfield's defence. Lord Erskine regarded (as lawyers always do) *emotional* before *physiological* evidence, and considered *delusions* to be the most cogent to the issue.

LUCID INTERVALS.

Lucid intervals existing in connection with madness, are often of a familiar character, manifested in the correct performance of social duties displayed sometimes by economical ability, punctual payment of bills, regularity in book-keeping, and trading accuracy, &c., which may also exist at the same time with *delusions*, and which being only *mechanical* and familiar tests of mental discipline, afford no clue of themselves to the nature of the delusion or illusion,

when such exists, or in any way, even to the existence of nervous disturbances and insanity.

Again, excess of intellectual ability and emotion may exist, and delusions also be manifested, and the former shall have no reference to the delusion. And a man shall labour under the strangest delusions, and perform his usual avocations with perfect accuracy and correctness, without being influenced by them. But the existence of *lucid intervals* constitutes the entire framework, character, and consequences, and typifies the undisputed existence of madness, which is already granted, while delusions frequently exist without madness.

Sir Joseph Jekyll, in the Duchess of Cleveland's case, says, "The law will not measure the size of men's capacities, so as they be *compos mentis*."[1] To constitute madness, "The phases are total deprivation, loss of memory and understanding, as forgetting his name. And the lunatic is held responsible for a criminal act during a *lucid interval*." These dogmas and rulings manifest little mercy for a diseased mind.

Lord Thurlow cogently says, in reference to civil contracts, the making of wills, and the disposition of property, "the burden of proof attaches to the party alleging such *lucid intervals*, who must show *sanity* and competence when the act was done, and to which the lucid interval refers; . . . and the evidence . . should be as strong and demonstrative of such fact, as where the object of proof is to establish derangement, which rule is most important and essential, and should be extended to all cases, criminal as well as civil. On the other hand, Sir Matthew Hale and Lord Coke say: "but acts done by him *inter lucida intervalla*,

[1] 'Pleas of the Crown,' v. ii, p. 573.

when he is of sound memory, shall bind him." [1] Every one should be held legally accountable for *criminal acts*, unless he has been proved by satisfactory evidence to be of *unsound mind*. Which leads to the consideration that *lucid intervals* have a most important relation to the legal bearings of insanity.

"However calm and rational the patient may appear to be during the lucid intervals, as they are called, and while enjoying the quietude of domestic society, or the limited range of a well-regulated asylum, it must never be supposed that he is in as perfect possession of his senses as if he had never been ill. In ordinary circumstances, and under ordinary excitants, his perceptions may be accurate and his judgment perfectly sound; but a degree of irritability of brain remains behind, which renders him unable to withstand any unusual emotion, any sudden provocation, or any unexpected and pressing emergency. Were not this the case, it is manifest that he would not be more liable to a fresh paroxysm than if he had never been attacked. And the opposite is notoriously the fact, for relapses are always to be dreaded, not only after a lucid interval, but even after a perfect recovery. And it is but just, as well as proper, to keep this in mind, as it has too often happened that the lunatic has been visited with the heaviest responsibility for acts committed during such an interval, which, previous to the first attack of the disease, he would have shrunk from with horror." [2]

The nature of *lucid intervals* is difficult to define, and equally difficult to explain, since to assert its connection and almost its constant association with madness, seems merely a

[1] 'Pleas of the Crown,' v. ii, p. 573.

[2] Haslam's 'Medical Jurisprudence of Insanity,' p. 56-58.

truism. A person may act and conduct himself rightly for a long period; in epilepsy he may do so for months and even years; and although quick to evade his *particular* hallucination, and point out, and oppose the errors of others, he may become suddenly attacked with *mania* himself, and neither the *epileptic*, nor those afflicted with intermittent madness, can *at any time* be held *responsible.*

If in civil matters the patient makes rational and correct dispositions, in the presence of witnesses, having arrived at an independent opinion of all the circumstances upon which he makes such disposition, the *act* speaks for itself; or, as Sir William Wynne says, "if it can be proved, and established that it is a rational act, rationally done, that is sufficient."

Nevertheless, in such cases of epilepsy, or intermittent madness, *madness* should be considered the rule; which, under cover of the usual mental habits and practice, is only temporarily masked by the *lucid interval.* Yet, in homicidal madness, if *lucid intervals* exist, they are not admitted by jurists, either to condone, or extenuate crime.

But it is required that the lunatic be proved what is called *entirely mad* to free him from the penalty of the criminal law; so that if he has lucid intervals, he is held to be a responsible agent. In civil matters, such as making a will, "a rational act, when rationally done," says Sir William Wynne, "proves the whole case;" and Swinburne says, "If wisdom and folly be blended, even if there be but one word sounding to folly, it proves phrensy," and the difference of liability to legal consequences between civil and criminal insanity, as at present ruled and practised, is great and inconsistent, the existence of madness being denied when *criminal* acts are done, under circumstances when its existence is acknowledged and admitted in civil acts.

The question is, whether *lucid intervals* confer the same moral, medical, and legal responsibility claimed from those who are free from madness, or whether the patient be exempted from responsibility altogether during their existence, the same as during the existence of continued insanity; and we think the second part of this proposition should be affirmed, and sustained, since the probability is, that in such cases, the proximate cause, and the pathological and physiological conditions are *persistent*, and may be called into activity by any accidental circumstance.

Freedom from epileptic symptoms for a long period, even where cerebral lesions have been supposed to exist, has been advanced by Dr. Prichard as rendering such patients amenable to legal and moral responsibility; but the exemption from epilepsy, may be only a temporary freedom from the emotional or exaggerated symptoms which usually attend it, and during which, nevertheless, any moment accidental causes of excitement may exacerbate the epileptical symptoms—such as indulgence and intemperance; and will frequently bring on a train of *cerebral* disturbances, and *mania*. And in many such cases, morbid conditions and anatomical changes have been discovered, *post-mortem*. Sir Alexander Morison discovered in one epileptic case (a sailor) a large *spicula* of bone in the *fulx cerebri*, the man had been wounded in the head, but conducted himself properly, with slight eccentricity, for a long period.

The conditions of insanity in relation to *lucid intervals* is this: insanity being in the system, as in *epilepsy*, either fully developed, or in a state of *incubation*, the paroxysmal madness is liable to commence, or to return at any moment, and without warning, and it is difficult to say when a lucid interval exists, when it is gone, and when it will return;

perhaps in the same sense that when fever is in the system, it is difficult to determine how long-continued fever shall remain free from remission, or remittent fever from intermission; and insanity dominates in the system in much the same manner; in both, the different states of intensity may change their type, and no rule exists to determine when the change may occur.

Lucid intervals may be considered an indication of a healthful power remaining; and the remission or intermission of the insanity offers favorable opportunities, if sedulously regarded and taken advantage of, to strengthen and arm the nervous system against relapse; also of ascertaining more accurately the exact condition of the patient's mind, very much as in the case of remission and intermission in constitutional fever.

What constitutes a lucid interval is very differently estimated. A *comparative* state of mental clearness, although incoherence, excitability, and even illusions may exist, is by some so considered; and a more than healthy manifestation of mental vigour and brilliancy, although exaggerated, is also considered to constitute lucid intervals; or, again, a passive state, frequently followed, and also preceded by a high maniacal excitement, is so considered; but as the *general* and *customary* conduct of a madman may be proper, and neither his manners, behaviour, nor acts be always *unreasonable*, his paroxysmal condition of madness may prevail for so short a period, and with such distant intervals as to render the existence of *lucid intervals* very obscure, and of no value in a criminal point of view, since all cases of insanity have lucid intervals, more or less, continuous madness, without remission or interval, being of rare occurrence.

Consequently, Judge Blackstone's *dictum*, that "if a lunatic hath *lucid intervals* of understanding, he shall answer for what he does during those *lucid intervals*, as if he had no deficiency," in most cases can have no safe application; and it should be enforced, that lucid intervals *never* confer *irresponsibility*, both as a physiological and forensic rule; and a *lucid interval* may be considered a masked condition of a diseased mind.

With respect to delusions, it may be further inferred that as they have no pathological or physiological conditions *by themselves*, to confirm or establish the existence of madness, if memory, will, and understanding be correct, they are insignificant evidence, and not to be depended upon, as they are easily simulated for the purposes of imposition.

Amongst the great names who have given judgments in madness, are Hale, Lyttleton, Coke, Blackstone, Mansfield, Erskine, Thurlow, Eldon, Denman; and amongst contemporaries may be named Lyndhurst, Brougham, and Campbell; but they have not found madness a facile recipient of *judicial* axioms, and have signally failed to subject *natural* laws, within legal and technical rules; and their judgments manifest contradictions and discrepancies; no two jurists scarcely agreeing in their rulings and judgments upon the question of madness.

Sir Frederick Pollock has decided that *delusion* can be legally noticed or interfered with, only if attended with acts amounting to criminality, and dangerous to society, which we shall hereafter find is viewed very differently by other jurists, and makes light of *delusion*, which Lord Erskine, on the other hand, has ruled to be the *true character of insanity*, "where there is no frenzy or raving madness."

And if this ruling of Lord Erskine's be not implicitly

accepted by lawyers, it comes nearer to the right view, and perhaps is less wrong than other judicial edicts, when supported by physiological and pathological conditions and evidence, which is generally the case.

In civil cases the quantity of error required to constitute insanity is, as we have before had occasion to notice, very small. In the making of a will, if folly and wisdom be mingled, the folly invalidates the instrument, and stamps the insanity and incapacity of the maker; but a homicide, to escape responsibility for crime, must be proved not to possess a glimmering of consciousness, memory, or understanding, knowledge of right or wrong, or any particle of reason; and the largest quantity of insanity is required and insisted upon, to cancel responsibility for homicidal acts, during which the manifestation being much greater we should have concluded less difficulty would have existed to establish the madness. In civil cases, perhaps, the complicated interests of property and civil rights, and personal liberty, may explain this anomaly.

The assistance of a commissioner to investigate criminal madness and homicidal acts would be a judicial instrument, which, when familiar with the various phases of insanity, would be less liable to be influenced by these contradictory rules. To admit the supposed lunatic to a *viva voce* examination before a commissioner would also avoid self-inculpation, since if insanity exists, *responsibility* ceases; and, on the other hand, should the accused be afterwards arraigned for felony, he would be permitted the privilege of a second trial on entirely different pleas, namely criminal pleas, while the inquiry has hitherto been limited, to a preliminary investigation by a civil commissioner. The objection, therefore, to *another* investigation would not exist in a case of

assumed or doubtful irresponsibility, since the second would take place surrounded by legal rules, precedents, and technicalities, before a criminal tribunal. The lunatic, in stating his case, or in reply to interrogations, will often assist the physician to trace the history of his case to pathological and physiological conditions; and the mutual intelligence of medical and legal investigation, would under such a practice, be engaged to unravel the condition of the mind.

The best witness of the existence of insanity is often the patient himself, and the safest and most satisfactory evidence will be often obtained from his testimony; and if in this way proof of insanity cannot be elicited, the presumption is in favour of the rationality and accountability of the supposed lunatic. The patient's replies to the points mainly insisted upon will go far to establish his real condition, and to determine if the will, memory, and understanding still hold dominion in his mind. Where responsibility terminates, is made indisputably evident by the existence of *mania, delusions,* and *diseased senses,* and by immoral and homicidal acts, whether accompanied by lucid intervals or not. But only physiological and pathological conditions, will give evidence which will prove satisfactory.

The following are the accepted tests of the condition of a *sound mind* before the English Courts, and, not possessing *physiological qualities,* they may be called *legal* tests of the condition of a sound mind:

1. The knowledge of right and wrong, good and evil.—(*Lord Mansfield's test.*)
2. The state called *compos mentis, or a sound mind.*—(*Lord Lyttleton's.*)
3. Absence of any practical delusion traceable to a criminal or immoral act.—(*Lord Erskine's.*)

The converse of which is—

1st. Ignorance of the knowledge of right and wrong, good and evil;

2d. Unsoundness of mind, or *non compos mentis*; and

3d. Delusions, traceable to a criminal or immoral act.

In cases of insanity brought to judicial investigation, it seldom happens that more than one of these conditions is manifested during the act under investigation, and it may not *individually* demonstrate the existence of insanity, unless also *delusion* exist, and be acted upon, connected with "ignorance of the knowledge of right and wrong, good and evil."

Lord Mansfield's decision allows only this one condition of the mind to *test* the existence of madness arraigned for criminal acts, namely, "an absence of the knowledge of right and wrong, of good and evil."

This test, *having no physiological quality*, has little signification of itself, since the existence of insanity cannot be tested by its opinions, but by its practice, for no one could be considered mad for his opinions. Absence of the knowledge of right and wrong, good and evil, as a judicial test of the existence of insanity should be also supported by the presence of delusion, or a total or partial *loss of understanding*, or mania, delirium, and the general paralysis of the insane, which conditions give physiological evidence of the will, memory, and understanding being implicated during their existence.

If *delusion* exists at the same time and in connection with Lord Mansfield's test, namely, a want "of knowledge of right and wrong, and good and evil," *it is an unmistakeable manifestation*, and as will and memory are absent in these cases, we have physiological evidence to establish the insanity. The impostor simulates delusions badly, but cloaks his de-

fence by affecting ignorance of right and wrong; while the lunatic unreservedly contradicts that he is ignorant of the knowledge of right and wrong, and asserts the contrary with much ingenuity, and he will not seek to evade its responsibility; nor can it be considered an ingredient of insanity if existing alone, it being an abstract proposition; and he will not avoid an analysis of his hallucination to establish and confirm the view he has adopted, although he may know its liabilities.

Further, it is not agreed of what right and wrong consist, nor at what age its knowledge is acquired; some acquire it early and intuitively, others late or never, and scarcely two individuals agree upon it; this is, therefore, too refined a test of insanity, and even in application to social practice is not accurately defined.

Lord Lyndhurst, in commenting on the judgment of Sir John Nichol, ruled "that unsoundness of mind cannot be restricted to *one point*, though it may manifest itself principally with reference to some particular object or person." And again he says, "It seldom happens that a person who is insane displays insanity on every question, and every subject.[1]" Many circumstances conducive, and, perhaps, necessary to the development of insanity, or of a mad paroxysm, may never occur until an unexpected and unforeseen accident explodes the paroxysm; consequently, the *crowning act* may be at any time, or *never* called into existence.[2] Again, in commenting on the same judgment, Lord Lyndhurst argued, concerning *partial insanity*, that "the mind is *unsound*, and not unsound *on one point only* and *sound in all other respects*, but that this unsoundness manifests itself principally in reference to some particular object or person;" and "it was

[1] Prichard, 'On the Different Forms of Insanity,' p. 16.
[2] Ibid.

not meant that a person could be partially *insane*, and *sane* at the same moment of time; *to be sane, the mind must be perfectly sound, otherwise it is unsound.*" [1] This doctrine includes the whole view of lucid intervals and intermittent insanity, and elucidates the question by showing the mode of their existence as an element of insanity.

Dr. Prichard says, "It seems on the whole to be the settled doctrine of the English courts at present, that there cannot be insanity without delusion; or that delusion is essentially required to constitute and establish criminal insanity. This is the doctrine of *partial insanity*, or monomania, and implies that a man may be mad upon one point and sane upon every other," [2] contradicting the foregoing *dictum* laid down by Lord Lyndhurst.

In civil cases, if a lunatic reasons correctly on all except one particular subject, it does not constitute or establish him of a sane or responsible mind. Sir Edward Coke says, "A little madness deprives the lunatic of *civil* rights; of dominion over and disposition of property, and annuls wills." But to exempt him from *responsibility* for crime, he again says, "the mind must be quite clouded; complete ignorance of the *knowledge of right and wrong, good and evil*, must exist;" and, as is ruled by Lord Hale, neither partial insanity, nor delusions alone are admitted in establishing insanity, the last not even when traced to the act, if *lucid intervals*, or a supposed *lucid interval*, happens to occur at the same time, so that, by this *dictum*, the existence of lucid intervals renders the party, under any circumstances, amenable to the criminal law. He further says, "there must be total alienation of mind, or total madness," to

[1] Shelford, 'On the Law of Lunatics, Idiots, &c.,' p. 46.
[2] Pritchard, 'On the Different Forms of Insanity,' p. 16.

exempt from guilt of felony or treason. This is that which, in "the Pleas of the Crown," is called by Sir Edward Coke "absolute madness, and total deprivation of memory: . . . if there be *lucida intervalla*, the madness in that case will not relieve from responsibility of felony or treason, if they be committed during that state," which also is inconsistent with Lord Lyndhurst's more modern ruling, as quoted above, and makes the lunatic responsible and amenable to punishment for crime, unless what these authorities call "absolute madness, and total deprivation of memory" should exist, while in civil cases the lunatic is absolved from responsibility and deprived of the power to make civil contracts, and perform civil offices, for a very small quantity of madness; even if the manifestation amounts only to folly, it invalidates the making of a will, while, on the contrary, insanity blended with crime is not admitted to be irresponsible, unless the madness be of the most aggravated character, but is punished with the severest penalties of the law, so that for inconsistency or even eccentricity in the making of a will a man may be found mad and considered irresponsible, but if he commits *murder*, should he have *lucid intervals*, he is held responsible for the act, and executed.

Lord Thurlow calls *lucid interval* "an interval in which the mind, having *thrown off* the disease, has recovered its *general habit*."

Dr. Ray (U.S.) very naturally takes a pathological view of the question to the effect that if insanity, resulting as it does from disease of the brain, be restored during lucid intervals, the brain must necessarily be restored also.

The French law holds the existence of madness absolutely to absolve from crime, "as, during it, *where* responsibility

begins, and *where* it *ends* can never be distinctly told." The act of devising property and the making of a will requires the exercise of thought, attention, judgment, memory, and understanding, symbols of a composed mind; the act of committing murder, on the contrary, implies their absence, the act of itself being a symbol of a disturbed mind, and gives the presumption that neither memory, will, nor understanding could have existed, if any corroborating circumstances exist to confirm it.

Sir Edward Coke says, "the execution of an offender is, for example, '*ut pœna ad paucos, metus ad omnes perveniat*,'" yet there can be no example and no warning from the gibbet of an executed madman, a folly which was perpetrated amongst many others in the cases of Lord Ferrers and of Bellingham, and also in the case of the Scotch vagrant *Howison*, who had for many years been a *wandering lunatic*, and at his execution stated that he had committed eight murders, which was supposed to be an entire *delusion*; but he emphatically denied having committed the murder for which he suffered, and of which there was the strongest circumstantial evidence. The whole of this case is too long to quote; but the following particulars are interesting:

"He had false perceptions, for he used to sit and appear to be brushing away the flies for hours together when there were no flies, and his landlady told him so. He had imaginary struggles in the night with witches, and was heard to cry out, "Hands off!" He had an almost incredible appetite for food, usually devouring half a peck of potatoes at a meal, with one or two pounds of a bullock's liver almost raw, and generally filthy. "Of this" (morbid apetite for food) "many circumstances in the insane could be furnished, some cases manifesting no other symptoms. The

sight of food renders them furious; they will dispute it with the dog and the swine. They gorge the stomach beyond all powers of digestion, calling incessantly for more.

Howison, like maniacs well known in madhouses, was, almost without ceasing, night or day, wounding himself to the effusion of his blood. He marked the chapel door-posts with it; he exhibited it dropping from his elbows; and he sucked it as he ate his meals.

He was solitary, silent, and sombre, like Lecouffe, Feldtmann, Papavoine, and Léger, and a whole class of madmen. Indeed, he was so uncommunicative that his counsel could not draw from him one word of his history or connections, in order to enlarge the evidence of his insane habits.

Lastly, he was under the influence of superstitious horrors, and kept off the supernatural evils he dreaded, by strange ceremonies, and above all by the fancied protection of the bible tied round his wrist, which it was proved he never read, and which, when removed at his meals, he placed round his neck, so as never to quit his person.

Application was made, without success, to the Secretary of State by Howison's law agent, for time to obtain further evidence of his insanity. To this the gentleman was emboldened by receiving the concurring opinion of the first medical men at Edinburgh.

Some time before his appearance at Cramond, Howison, on being refused alms by a gentleman near Edinburgh, to whose house he came, made a savage assault upon him (for his muscular strength was very great, which is often the case with maniacs), seized him by the scrotum, and kept his hold till the gentleman had nearly fainted. His whole demeanour was frightfully ferocious, and he was

knocked down by one of the farm servants before he quitted his grasp.

When at parting with the deputy governor of the jail, he avowed that he felt at the moment a strong impulse to murder him, and he had been most kind to him; while in the same breath he inveighed against his lawyers for not resting his defence on the defective evidence, as he viewed it, of the murder, but pleading that he was mad, which, as he alleged, was utterly untrue. His voracious appetite for food ceased only with his breath."[1]

It is recorded that a man would eat a leg of veal with wild vegetables, as sow-thistles, at a meal.[2] Another would eat to the weight of fourteen pounds daily, of cats, rats, and dogs, some entrails and also candles.[3]

The following cases also testify to the extreme vengeance of the law:

"Feldtmann was a sailor, fifty-six years old, who, according to his own account of himself, had been silly in his youth from the effect of an injury in his head. He was occasionally idiotical or deranged; but in general industrious and honest. After attempting to gratify an incestuous passion for his own daughter, who had invoked aid of the police to resist his attacks, he stabbed her to the heart, wounded his wife and another daughter, and then gave himself up willingly to a crowd who surrounded him, exclaiming, in reply to their reproaches, "It is well done." In this case the existence of insanity was not fully esta-

[1] These particulars are given by Mr. Simpson, advocate, in a very interesting and valuable paper on Homicidal Insanity, published in No. V of the 'Edinburgh Law Journal.'

[2] Vide 'Philos. Transactions,' v. xxii.

[3] 'London Med. and Phys. Journal.'

blished by facts; but it seemed evident that the miserable wretch, who suffered for his offence, had scarcely intellect enough to comprehend its nature, and to perceive the turpitude of his conduct, though he foresaw the destiny which awaited him. M. Breochet considered his brain to be in a condition different from that of health; and M. Georget's opinion was, that Feldtmann was a man whose weak intellect was overwhelmed by a passion constituting in itself a real disease, which *ought to have been cured by separating the unfortunate wretch from society*, without resorting to the barbarous expedient of extinguishing it together with his life."

"Louis Lecouffe was an epileptic from infancy, had often been deranged, had seen visions, and had been accounted, by all who knew him, to be deranged or idiotic. At the instigation of his mother, he was induced to rob and murder a woman, against whom he entertained no malicious feelings. He was executed. This was a case not strictly of moral insanity, but of imbecility, which rendered the accused a victim to the evil indulgence of other persons, possessed of greater intelligence."

"L. A. Papavoine was a solitary, morose wretch, who was considered by all who knew him to be half crazy and melancholic. Wandering in the woods of Vincennes, he saw a lady walking with two young children. He went to a village and bought a knife; returning quickly, he accosted the lady with pale looks and agitation, and stooping suddenly stabbed one of the children; while the affrighted mother was attempting to remove it, he killed the other. He took flight, but was overtaken and brought to trial; and though he was proved to be insane, and it was manifest that he had perpetrated the horrible act without motive, and

under the influence of disease, was put to death according to law. Papavoine declared that he could not assign any motive for his act; that it arose from a spontaneous impulse. The opinion of physicians leaned to the probable existence of insanity, but they were not decided. M. Georget says, 'As a physician we cannot but remain in doubt on so grave a question; if we had been on the jury we should have voted for his acquittal.' Yet the presumptive and direct evidence of insanity was very strong in this case. It was proved at the trial that the prisoner's father had been subject to mental aberrations, to fits of fury, during which he broke and smashed everything, and that the son had been marked as a *solitary being*, shunning society, fleeing from his companions, and always sombre and melancholy, walking often alone in solitary places. Nobody ever knew him intimately, and he never communicated his thoughts to others. In 1823, the utter ruin of his father increased the prisoner's melancholy and irritability. He had besides an attack of mental alienation, which lasted ten days, and two witnesses deposed to it as follows: 'He was,' said a person employed in the Marine at Brest, where the prisoner had a clerkship, 'in a state of fever, he said that a man beset him, that he saw him, and wished to have a pistol to defend himself with.' An officer of health, under whose care the prisoner had been, deposed that he was sombre, suspicious, believing always that people were occupied about him, fleeing the society of women, and often of men; his temper was exasperated, he saw a secret enemy who appeared to him as a ghost and attempted his life. The witness believed the prisoner to be melancholy and hypochondriacal. After his father's death he became worse, gave up his employment at Brest, when he only the

more required it for a livelihood, and returned home, where he insisted with his mother that his father was not dead but had been buried alive. He went to visit a friend for some days, who thought him 'physically and morally changed.' He would often cry out, with the accents of despair, 'What! not an instant of happiness? I believe in truth that I am mad.' A paper was one day in his friend's hand, on which he remarked the letters O. N. 'What is the meaning of that?' said Papavoine. 'Nothing,' said witness. 'I know what it means; it means they drown people here' (*on noyê ici*). Several other strange fancies were proved, such as horror of a razor when they proposed to shave him, and the like. He came to Paris to settle accounts with his banker, still indulging in solitary walks, one of which happened in the wood of Vincennes. The jailor of the prison of *La Force*, in which Papavoine was confined before his condemnation, deposed that he was sometimes in a most terrified state; that he had moments of fury when his hair bristled up, the only time he (the jailor) ever saw the hair so affected; his countenance became of a lively red, and he terrified the very soldiers that surrounded him."

The like injury, nay crime it may be called, was only narrowly avoided in the case of Hadfield, whose delusions, as well as insane acts, were most manifest.

If Bellingham had been respited and placed under observation for a time, all doubts might have been solved, and all suspicion of a vengeful execution avoided. Lord Kenyon, who tried Hadfield, acknowledged that he was insane both before and after the act was committed; but that further proof should be offered in evidence that he was also mad at the precise moment when the act was committed. Violent

injury of the brain and nervous system, as in Hadfield's case, clearly establishing pathological and physiological conditions, may take away responsibility; but time was not permitted for this investigation in the case of Bellingham, and his brain was not examined.

We meet with epileptics in whom the latent condition of madness may have existed totally unsuspected for years, until some trivial accident or excitement may unmask the explosive elements, which culminate in a criminal act, the result of an irresistible impulse; and in these cases we always, upon *post-mortem* inquiry, find an abnormal state of the cerebral or central parts of the brain, to give satisfactory pathological and physiological explanations of the state of mind which led to the perpetration of the act. A similar condition of homicidal impulse is induced by irritation of the nervous centres from profuse or improperly continued lactation, upon cachectic subjects, or during the parturient state, and also at the epochal periods of the female, during which the crimes of homicide and infanticide are frequently committed, manifesting either hysterical or epileptical madness. The mad homicide rarely makes any choice or distinction of his victims, but is indiscriminate, and destroys, without motive, premeditation, or warning, those to whom he gains most easy and immediate access; neither does he select place or opportunity, or practise secrecy, his victims being the nearest and dearest in familiar intercourse with him; he avows his act, and gives himself up to justice, and assigns the most frivilous motives for his act, sometimes manifesting a calmness, abstraction, and confusion, and at others considerable violence and irritability.

In strong contrast is the case of a man who, some years

ago, was confined at Hanwell, of a child-like mind, quite harmless, good humoured, amiable, and docile; the head and features were singularly symmetrical, and the countenance of a pleasing and agreeable expression, with an elevated forehead and intelligent eyes; but the measurement of the head was about that of a child of five or six years of age. These cases always approach imbecility, or display defects of will, memory, or understanding, more or less.

Dr. Rush gives the following case of so-called *Kleptomania,* which shows the absence of the function of will. He says, "There are persons who are moral in a high degree, as to certain duties, but who, nevertheless, through the influence of their disease, are subject to some one vice. A woman was remarkable in her obedience to the moral law in every particular except one; she could not refrain from stealing. What made this the more remarkable was, that she was in affluent circumstances, and not addicted to extravagance in anything. Such was the strength of this vice, that when she could not lay her hands upon anything of value, she would fill her pockets with bread; she both confessed and lamented her unhappy propensity." "Lavater mentions a physician, who never entered the chambers of his patients without stealing something, taking no further care of the purloined articles. In the evening his wife inspected his pockets, and returned the keys, scissors, pincushions, &c., to their rightful owners."

The following is another case, from Prichard.

"A gentleman of independent fortune was at Scarborough, and in passing through one of the streets, he saw a friend and his daughter in a shop, whom he joined. They left the shop together. In a short time the mercer waited upon the father of the lady, and regretted much to state

that his daughter had, no doubt by mistake, taken a silk shawl off the counter. The father contradicted the charge, and inquired who had been in the shop at the time that the shawl was missed. The reply was, 'No one but himself, his daughter, and the other gentleman.' The shop-keeper accompanied the gentleman to his friend's residence, in the hall of which they found the great coat that his friend had worn in the morning, and in one of the pockets was the lost shawl. The gentleman returned it, remarking that it was one of his friend's peculiarities sometimes to take what was not his own."

The author was acquainted with the case of a provincial banker of great wealth, and in much esteem in the neighbourhood where he resided, a Mr. M—, whose propensity to petty theft became so inveterate, and so unconsciously done, that his wife dare never lose sight of him, and when he accompanied her "shopping" a messenger always went with them, and took back the articles which he invariably pilfered on such occasions. He was perfectly harmless, and sane in all other respects.

Sir Matthew Hale says, "There is a partial and a total deprivation of mind. Some persons who have a capital use of reason in respect to some things, are yet under a particular dementia in respect to some particular subjects or discourses, or else it is partial in respect to degree; and this is the condition of very many, especially melancholy persons, who, for the most part, discover their defect in excessive fear or grief, and are yet not wholly destitute of the use of reason; and this partial insanity seems not to excuse them in the commission of any offence in the matter capital, for, doubtless, most persons that are felons of themselves are under a degree of partial insanity when they commit these

offences." But the distinction is, that in the one case the Will, Memory, and Understanding are intact, and in the other they are wanting, one or the other of them.

"M. Fabret declares that civil law unites with science to proclaim lesions of the will to be the most constant and important phenomena in insanity; the lunatic cannot be either responsible or culpable, because he is deprived of moral liberty." And M. Fabret also says, "that this principle is sanctioned by the legislation of all nations." But the following case, which he gives in his 'Treatise upon Hypochondriasis,' is an unfortunate elucidation of this doctrine, since it manifests neither absence of Will, Memory, or Understanding, which are the true and essential elements of madness, but, on the contrary, a full possession of them all, and also of reason, and even manifests greater perspicacity than his jurors did in the view he takes of his own case.

"A man, aged forty-five years, became suddenly subject to violent fits of jealousy, and having one night seen his wife conversing with one of his neighbours, he imagined that she was faithless to him. He said nothing to her at the time, but suffered her to retire quietly to rest, and when she had fallen asleep he went and stabbed her to the heart. The next morning he went and delivered himself up to the judicial authorities, and declared his crime. Upon his trial for the murder, notwithstanding his assertions that he was perfectly in his senses at the time he committed the deed, and that he did it solely because she merited death, he was pronounced to be insane. Some time afterwards the justice of this sentence became apparent, for he committed suicide, having previously written a paper, stating that his only motive for not putting an end to his own existence at the

time he murdered his wife was, that he preferred receiving the punishment he deserved at the hand of the public executioner; but that since the law had not awarded so just a retribution, it remained for him to rid society of so guilty a being as himself."

Mr. Pinel's experience at the Bicêtre convinced him that the *unreasoning condition*, was not the exclusive *phase* of madness. "I was not a little surprised to find that there were many madmen, who at no period gave any evidence of lesion of the intellectual faculties, but were under the dominion of instinctive and abstract rage, as if their active faculties alone had sustained injury." Earl Ferrer's was a case of this kind, as also the following, related by Dr. Crawford, which occurred in the Richmond Lunatic Asylum. "The individual was intelligent, plausible, and ingenious, but had been from his earliest infancy the scourge of the family. He had entered the army, where he was repeatedly flogged for his misconduct; and was at length drummed out as an incorrigible villian, for having attempted the life of one of his fellow soldiers. He never evinced the least degree of mental incoherence, nor any kind of hallucination. He was ultimately sent to a lunatic asylum for having attempted the life of his own father. The governors and medical officers of the asylum, often had doubts as to whether they were justified in retaining him as a lunatic. He appeared, however," continues Dr. Crawford, "so totally callous with regard to any moral feeling or principle, so thoroughly unconscious of ever having done wrong, so completely destitute of all sense of shame or remorse when reproved for his vices or crimes, and had proved himself so utterly incorrigible through life, that it is almost certain that any jury before

whom he might be brought, would satisfy their doubts by bringing him in of unsound mind."

M. Georget, in the 'Dict. de Médecine,' well describes this condition of madness, as follows: "When the cause which produces insanity is not immediate, the thoughts become affected gradually, and often imperceptibly. The patient himself is generally conscious of some disorder in his intellectual faculties; he is beset with new and odd notions, and by unusual inclinations; he feels himself changing in his affections, but at the same time he preserves a consciousness of his condition, is vexed at it, and tries concealment; he continues his occupation as much as he can, and as people do in the first stage of intoxication, he makes every effort to appear reasonable; meanwhile, the bystander remarks something unusual and extraordinary in his habits and character; if he had been gay and communicative, he becomes sullen and morose; if orderly and economical, he becomes confused and prodigal; if moderate in his religious or political opinions, he passes to an extreme exaggeration in both: the exterior of candour and modesty gives place to an air of conceit and assurance which (especially in women) astonishes us."

Haslam says, "The madman's belief in the good of his principle, and his faith in the right of his actions, are superior to arguments. His motive cannot be controlled by reason, nor baffled by the fear of punishment; impressed with a belief in the truth of his delusion, he hurries forward to its accomplishment, and in the pursuit of the phantom, cannot be deterred by the most awful consequences."

Ray says, "Madmen's abstract conceptions of crime not being perverted by disease, presents its hideous outlines, as strongly marked as ever they were, in the healthiest condi-

tion of their mental faculties, and the disapprobation they express at the sight of crime, arises from a sincere and honest conviction. The particular criminal act, however, becomes separated in their minds, from its relations to crime in the abstract, and being regarded only in connection with some favorite object which it will obtain, and from which they see no reason to refrain; it may, in fact, be regarded as of a highly meritorious and laudable nature." This is instanced in the anecdote related of Bellingham, in the marginal note, p. 99.

Haslam, again, says, "That if violence be inflicted by such a person, during a paroxysm of his madness, there is no acuteness of metaphysical reasoning or investigation, which can trace the succession of his thoughts, or the force of the impulses by which he is goaded on to the accomplishment of his purpose; and as it would be difficult, in a person of the soundest mind, to detect the succession of thoughts, tracing that which was most remote from that which was proximate to the action, it can less be expected that the medical evidence should be capable of noting the consecutive irregularities of a disordered intellect." But it is not difficult to detect whether the physiological conditions of Will, Memory, and Understanding, be correct or not.

But sometimes the madman will explain or comment upon his delusions, as in the following case, related by Muratori, of a "Jesuit, named Segambari, who believed himself to be a cardinal, and claimed to be addressed by the title of 'Eminence.' A friend was anxious to convince him of his error, and obtained a patient hearing of his arguments; when he had finished, the madman replied, 'Either you consider me mad or rational; on the latter supposition you do

me injustice by your reasonings, and on the former, I hardly know which is most mad, I for believing myself to be a cardinal, or you for thinking to reason a madman out of his folly.' "

In alluding to the passions in connection with madness, M. Müller says, "The passions, by means of the change which takes place in the brain, affect the whole nervous system. Many distinguished writers, for example, Bichat and Nasse, although they admit that the brain is the seat of the higher intellectual faculties, still maintain that other organs also, as the abdominal and thoracic viscera, have a certain connection with the mental functions, and incline to the belief that the source of the passions may possibly be in those organs. They found their opinion partly on the circumstance of the viscera of the chest and abdomen being affected during the prevalence of passions of the mind, and partly on their being frequently diseased in cases of insanity. The intestinal canal, liver, spleen, lungs, and heart, are certainly frequently the seat of disease in lunatics, and occasionally even when no palpable change can be detected in the brain itself; and here the diseases of the abdominal or thoracic viscera may have been the exciting cause of the mental affection, but only in the same way as other causes might excite it by the impression communicated to the brain, there being in it some pre-existing disposition to morbid action, either hereditary or required. Hence in these patients, by removing the morbid change in the other viscera which have influenced the brain, the disposition in the latter organ to abnormal action may be reduced again to a latent state.

"Although, however, we are satisfied, upon grounds derived partly from comparative anatomy, and partly physiology and

pathology, that the seat of the mental operations is the brain, and no other part; that the nerves excite these operations, and are the instruments for executing what the mind directs, and that all the other parts of the body are subject to the influence of the nerves.

"From the considerations and facts thus premised, we are now able to determine the question, whether lesions of the texture of the brain modify the mind itself; whether in mental affections the mind or its 'essence' can itself be diseased, or whether merely the action of the mind by its instrument be altered. Since, as we have seen, the existence of the mental principle does not depend on an injured condition of brain, and since it is certainly present, although in a latent state, in the germ, separated from the parent animal, it is evident that a change in the structure of the brain cannot produce a change in the mental principle itself, but can only modify its actions.

"Two cases of congenital idiocy have been reported to us, in which the cranium is so low, that the representations given of them call to mind the state of the skull in hemicephalous monsters; but here the cranium is perfect. These idiots are the two sons of a widow named Sohn, living in the colony Kiwitsblott, a german mile from Bromberg, one is aged seventeen, the other ten years, both, enjoying excellent health, are at the same time so stupid that they do not remember their way back to their home if they leave it but a short distance; and cannot unbutton their breeches, although they have full powers, motion, and volition in all parts of their body. They manifest their volition only in eating and drinking, and in destroying everything which comes into their hands; they are, however, tractable, and not malicious in disposition, but on account of the imperfect

foundation of the brain the development of the higher mental faculties became impossible.

"Since the action of any part always induces a change in the organic matter which composes it (see p. 54), it necessarily follows that immoderate exertion of the mind, a continued direction of it to one object consequent on external circumstances or great mental excitement, must react on the organization of the instrument of the mental operations; and, although the removal of these causes may be very important in the eyes of the physician, yet the state of the organ itself is the proper object of his treatment; and the wrong direction of the thoughts is not the essence of the mental disease, but can merely be one among its numerous exciting causes."[1]

Again, we discover in sexual, or uterine disturbance, a chain of peculiar influences which beset the female, in connection with her moral and intellectual qualities and training, and by which she becomes weaned from the strict laws of nature, at the moment she adopts the laws of civilisation, refinement, discipline, and morality; and the emotion called *love*, is different from the simple animal instinct, it being, more or less, a sentiment of the mind, which influences the sexual functions in a different manner, and which subdues the impulses of nature, to show attachment and to gratify preference; while the animal instinct is only manifested in the indiscriminate propagation of the species; and if the female disobeys this law of attachment and preference, it is probable, (if dislike exists,) that procreation will be less likely to occur.

[1] Müller's 'Physiol.,' pp. 816*-17*, 819*-20*.

["Some German writers, as for example, Heinroth, have gone so far as to regard all insanity as a wrong action of the soul, and to speak of the insane as sinners."]

Sexuality is peculiar to all animals and vegetables which have life, and the sexual contact appears to give mobility, action, and expansion to the passive germ, by which it seeks and obtains the "air, moisture, and warmth," which it requires for its development and growth, and in the absence of which it perishes.

This artificial condition, produced by civilisation and morality, induces mental influences, such as anxiety, solicitude, hope, reverence, and attachment, as well as great physical peculiarities, *sui generis*. Thus the instinct of sexual intercourse, or of procreation, often either evaded, deferred, or altogether disappointed in the civilised female, rules the uterine system *abnormally*, and the civilised female is different in her sexual functions from the savage; which leads to physical and nervous disturbances, such as *dysmenorrhœa*, *amenorrhœa*, and *menorrhagia*, from which we have reason to believe the latter is exempt: and it is even doubtful if the catamenial function be not dependent upon the condition of civilisation.

In addition to these, the contact of the males discovers at the same time a new existence, and also a new set of sympathies; and the parturient functions, and those of *lactation*, induce sources of disturbance and irritation, by a reflex action of an intractable character, peculiar to the human female, and mania, delusion, and illusion, frequently supervene, and establish hysterical or puerperal madness.

But as these have the character of functional disturbances, they are tractable and amenable to medical treatment, as, also, may those be considered which proceed from the opposite cause, namely, the refrain from the contact of the male; producing, on the one hand, either suppressed, or, on the other, profuse *catamenia*: the Graffian

vesicles, under such circumstances, being either abnormally retained, or profusely expelled.

Showing, in addition to those which Müller has particularly named, other and frequent sources of "the change," to which he reverts, "which takes place in the brain" and which "affects the nervous system" *from the influence of "the passions,"* and of functional influences producing a reflex action upon the brain: and these cases always manifest a homicidal tendency.

We quote also the following cases of somnambulism, to show, that volition may be active, when the will is asleep: upon which subject, M. Malle remarks, "that to make a person responsible for acts committed during sleep, is to imitate the conduct of a Roman emperor, who condemned a person to death because he had dreamt that he had killed him; thus punishing as a crime, an idea which had occupied his mind during sleep."

This may be considered only a degree worse than the following case, narrated in the 'British and Foreign Medical Review: "A pedlar, who was in the habit of walking about the country armed with a sword-stick, was suddenly awakened one evening while lying asleep by the road side, by a man seizing him by the shoulders, and shaking him roughly. The pedlar, in his fright, drew his sword, and stabbed the man who assailed him, who afterwards died. The pedlar was tried for manslaughter; his irresponsibility was strongly urged by his counsel, on the ground that he could not have been conscious in his half-waking state of terror. This was strengthened by the opinion of the medical witnesses. He was, however, found guilty."

M. Savarin, in his work, 'Sur la Physiologie du Goût,' gives the following case: "One evening, a monk entered the

apartment of the superior of his convent, with his eyes open, but fixed; he held in his hand a large knife, and going direct to the bed of the superior, plunged the weapon into the bed; on returning to his own chamber, his countenance wore an expression of joy and satisfaction. Upon the morrow, the superior asked him the cause of his strange behaviour during the night; the monk then informed him, that he dreamt that his mother had been killed by him (the Superior), and that her apparition had demanded vengeance at his hands; he became transported with fury, and arose with the intention of stabbing the assassin of his mother; soon afterwards, having returned to his bed, he awoke, and was glad to find he had only been dreaming."

Lord Erskine advocated a milder code for insanity, and says, "I think as a doctrine of law, the delusion and the act should be connected; . . . in cases of atrocity the disease and the act should be apparent." And again, "The dominion of insanity . . . annuls a man's dominion over property, dissolves his contracts, and other acts which would otherwise be binding in a civil sense; and it takes away his responsibility for crimes." [1]

Dr. Ray justly observes, that the law virtually says, "Your reason is too much impaired to manage your own property; you are unable to distinguish between those measures, which would conduce to your benefit, and such as would end in your ruin, and, therefore, you are wisely deprived of all control over your actions; but, if under the influence of any of your insane delusions, which have rendered this step necessary, you should kill your neighbour, you will be supposed to have acted under the guidance of sound

[1] 'Erskine's speeches, 'Defence of Hadfield,' p. 126.

reason, and you will be tried, convicted, and executed, like any common felon, whose understanding has never been affected by madness."

Georget says, "These legislators appear to place a higher value upon the property of individuals than upon human life."

Mind in health, must have a certain quantity or quality of organization, sufficient to testify a capacity for the exercise of will, memory, and consciousness, which is an inferior capacity than is required, to possess "the knowledge of good and evil, right and wrong," and superior to the state to which Lord Erskine refers, which annuls a man's "dominion ever property, &c." And there are often very harmless minds, as in the instance of idiots, *but which are not to be depended upon, or to be held accountable.* And Lord Erskine says, "although he" (a mind) "may not be lunatic, yet if so infirm, unable, and imbecile as not to be able to perform the duties for which mind is required, and understood to be endowed, is he not in the state of unsoundness of mind contemplated?" and consequently irresponsible for criminal acts.

And again "In the case of a person who is sometimes sane and sometimes insane, if there be in the will or deed, mixture of wisdom and folly, it is to be presumed that the same was executed during the person's folly, even if there be but one word sounding to folly."

This is the rule in *civil law:* while Justice Hale's dictum is that "one who hath as great understanding as a child of fourteen years ordinarily hath, is responsible for criminal actions."

The analogy of "the mind of a child" does not apply, since *it* has not been any other, than "the mind of a child," "and

never having reached maturity, was consequently not matured, and yet is not considered in a state of *unsoundness.*"

"After injuries of the head that have been eventually followed by idiocy, the *failure of the memory* has been the first mental symptom observed."[1] And failure of memory almost always leads to delusions.

"Locke says, "Memory is an intellectual creature; is necessary in the next degree to perception. It is of so great moment that where it is wanted all the rest of our faculties are in a great measure useless; and we in our thoughts, reasonings, and knowledge, could not proceed beyond present objects, were it not for the assistance of our memories."[2]

Haslam says, "Incapability to the management of affairs is sufficient manifestation of unsoundness."[3]

Lord Eldon says, "Mere *inability, imbecility,* upon oath found by jury or commission, won't do for the chancellor to grant a committee either of person or estate, but it must be an *unsound mind* found for this." Therefore *unsoundness of mind* is the question for the medical man to decide, which being a generalisation, leaves the question perhaps in the most favorable position for a judicial issue.

However partial may be the madness, or few and small the delusions, if the case be carefully observed, insanity may be demonstrated by physiological conditions, and although the courts discourage carrying inquiry beyond moral and emotional evidence, and the definitions which have become judicial traditions, physiological evidence is no doubt strictly

[1] Mayo's 'Physiology,' pp. 217-18.
[2] Locke, 'Concerning the Human Understanding,' v. i, p. 114, § 8.
[3] Haslam's 'Jurisprudence of Insanity.'

inductive in reference to madness, and gives the only conclusive and satisfactory clue to its existence.

The punishment of homicidal madness amounts to imprisonment for life, and therefore a narrow definition of what constitutes so-called criminal insanity is not desirable, especially at a time when the criminal law has already become divested of much of its severity and vindictiveness, nor is it required for the safety of society. The condition of the insane, and especially of the criminal lunatic, is better cared for at present than in the time of Hale, Coke, Blackstone, Kenyon, and Mansfield, when the insane were considered little better than *feræ naturæ*.

The following are submitted as the *physiological* conditions attending the existence of madness, and which exempt in all cases from responsibility, equally, either for *criminal*, or *civil* acts.

1st. *The existence of practical delusions, in combination with either loss of memory, or loss of the function of the will.*

2d. *The existence, separately or combined, of any of the preceding conditions, with ignorance of "right and wrong, good and evil."*

3d. *A total deprivation of understanding constituting "unsoundness of mind" (non compos mentis).*

Responsibility exists for criminal acts if there be an usual share of understanding, or a share equal to the knowledge of "right and wrong, good and evil," and, if at the same time there exist *no practical delusions.* Responsibility also exists if the function of memory be correct, and also if the function of the will be correctly exercised, even if at the same time there should be slight delusions.

Delusions without privation of memory, will, or understanding, are no true signs, not having the elements of

madness, but rather of want of judgment, and do not confer irresponsibility before the law, since the will may remain strong enough to control them, as in the case of Nicolai, of Berlin; and delusions may be simulated for criminal purposes.[1]

Premeditation constitutes an important feature, and indicates the existence of a state of *compos mentis*, and also implies and establishes the existence of consciousness, will, memory, and understanding.

Motives and principles of action, if they do not spring from insane delusions, also imply a responsible state of mind. "Such, however, is not the case with the unfortunate *homicidal maniac*. He is driven to the commission of crimes the most abhorrent to his very nature . . . and has been known to incarcerate himself in order to avoid the possibility of indulging his atrocious crimes;"[2] which condition strongly denotes the absence of *will*.

Each case is characterised by some new feature; but in every one it may be discovered whether the mind be defective in exercising the will, memory, consciousness, and understanding, which are physiological symbols of the mind in health, and which, with the usual moral evidences, should determine the soundness, or unsoundness of the mind, *whether delusions be present or not*.

To constitute a sound mind, will, memory, and understanding are necessary; and the existence of any one or two of those intellectual faculties, without the others, is usually attended with delusions, imbecility, fatuity, and madness: and the distinction between a diseased and healthful mind, is, consequently, not difficult to be made.

[1] *Vide* Appendix I.

[2] Winslow's 'Plea of Insanity in Criminal Cases,' p. 62.

Some healthful minds may be stronger than others, and some diseased minds weaker and more diseased than others; yet the existence of will, memory, and understanding, all of them in a small, or large, *or in some degree*, will always indicate a sound or healthful mind; and their absence, the presence of mental *disease*.

Lord Mansfield's doctrine, as a test of madness, namely, "the absence of the knowledge of right and wrong, or of good and evil," is not satisfactory, inasmuch as in its application to particular cases, *understanding* and *memory* may exist, but the function of the *will* may be absent; in this condition delusions or kleptomania may exist; or a person may know right from wrong, but may not have the force of *will* to practise them:[1] and if his memory be gone he will labour under practical delusions, and yet know right from wrong, and good from evil. And the individual must be judged by his actions and not by his opinions, more especially as *right* and *wrong* are abstract propositions; and a knowledge of right and wrong is not, as we have before stated, a proper test, or to be depended upon, for madness: since right and wrong are not defined by the common law, for an act which in the abstract may be just and right, in practice may prove injurious and illegal, and infringe upon the rights of others, and the property of individuals.

In conclusion, we will recapitulate the physiological conditions, which we argue to denote the existence of madness.

1. Practical delusions, in conjunction with privation of the function of memory, or of the function of will, or of both of them.

[1] *Vide* Cases at pp. 121, *et. seq.*

2. The privation of either of the above, namely, of the function of memory, or of will, and also, at the same time, of the "knowledge of right and wrong, good and evil."

3. A total privation of understanding, constituting unsoundness of mind, or *non compos mentis*.

Thus, as before stated, responsibility is established, if there be a usual share of understanding, equal to "the knowledge of right and wrong, good and evil," and if, at the same time, *no practical delusions* exist: also, if memory, will, and understanding exist, even if there be *delusions*, for delusions alone are no signs of madness.

A healthful condition of the will cannot exist, unless, at the same time, memory have existence, and the faculty of memory is so nearly allied to that of will, that their integrity is necessary to a healthful condition of the mind. Lord Littleton holds a *sound* memory "to be evidence of a sane mind," &c. "A man not of sound memory" is explained by him to be "*non compos mentis, amens, demens, furiosus lunaticus, fatuus, stultus,* or the like: *non compos mentis* is the more sure and legal."[1] "Sound memory" is also held, by Blackstone, "to be evidence of a sane mind;"[2] memory, will, and understanding would seem to have been used almost synonymously by Coke and Hale.[3]

And Lord Littleton says, again, that a man who is born deaf, and dumb, and blind, is looked upon by the law in the same state with an idiot, being supposed incapable of any understanding, he wanting all the senses which furnish the human mind with ideas."

[1] Highmore, 'On the Law of Lunacy,' p. 1; Haslam's 'Medical Jurisprudence of Insanity,' 1817, p. 54, et seq.

[2] Blackstone's 'Commentaries,' p. 24.

[3] Sir Edward Coke's 'Reports,' v. ii, p. 573? and *vide* Appendix H.

We will suppose a case, in which ignorance of the knowledge of right and wrong, and of good and evil, is combined with loss of *will*, in which case a defective or a diseased state of *volition* would exist, amounting to idiocy, and delusions would be also manifested, attended probably with homicidal acts and tendencies.

The same would attend a loss of memory, and if accompanied with ignorance of right and wrong, good and evil, idiocy or dementia would be also an almost inevitable consequence.

Or should both the loss of memory and the loss of will be combined, delusions would become inevitable, and consciousness would become impaired, and illusion and delirium would probably exist.

The following cases will elucidate how important are the functions of *will* and *memory*, to the existence of a sound and healthful mind, and how completely their absence establishes the existence and dominion of madness, and confirms and fully sustains the propositions endeavoured to be enforced and maintained in the above argument.

The following cases of LOSS OF MEMORY, AND LOSS OF WILL, are extracted from Dr. Haslam's book on Medical Jurisprudence.

"In some instances of homicidal insanity the patient after recovery has no recollection of any of the circumstances which transpired during the paroxysm. A man under Dr. Haslam's care had, during a fit of furious insanity, destroyed two children and a woman. He was confined and died in a madhouse. On several occasions Dr. Haslam endeavoured to draw from him some account of the motives

which induced him to destroy the children and the woman, he uniformly and steadily persisted, that he had no recollection whatever of such an occurrence. He said he had understood he had done something which was very wicked, and for which he was confined, but he thanked God that he had no more memory of what had passed, than if he had committed it in his sleep.

Another case is related by the same authority, of a lady who, during an attack of insanity, attempted to commit suicide. After the lapse of three weeks, as she was sitting in her usual manner, she uttered a shriek, appeared for a few moments in a state of alarm and confusion, and suddenly recovered. Dr. Haslam observes, 'Of her repeated attempts at suicide she had not the slightest recollection.'"[1]

Haslam relates the case of "a young lady who became insane in consequence of having experienced some severe disappointments. She attempted to destroy herself in various ways, and was therefore obliged to be strictly restrained; but to others she manifested no evil intentions. When spoken to she returned correct answers, although she never began a conversation. During the day she sat apparently sullen and abstracted, and seemed to take no notice of what was passing.—He says, when I visited her the following day, she received me as a perfect stranger, and was not conscious she had ever seen me before; and during several subsequent interviews, in order to be certain of her recovery, I was persuaded she did not retain the slightest remembrance of any of the circumstances of her malady."

He also mentions the case of "a young man with heredi-

[1] 'Haslam's 'Medical Jurisprudence of Insanity,' p. 55.

tary predisposition to insanity, his mother and grandmother having been so disordered, who, in consequence of severe losses, was seized with a paroxysm of furious madness, which continued without abatement for four months. At the expiration of three months he had a considerable mortification on the lower part of the back, which required surgical attention during three weeks. When the sore was healed, he was removed to another situation for the treatment of his insanity, where he perfectly recovered. After his complete restoration he neither recollected the asylum where he was first placed, the disease on his back, nor his removal to the situation where he ultimately regained his reason."

This homicidal impulse may be also suddenly developed and manifested by the absence of will, and it may be a momentary feeling; to elucidate which we will quote the following cases:

"Dr. Pagan observes, that a patient confessed to him that he never goes near an open window in the upper part of his house without being afraid, as he thought he should yield to the extraordinary impulse in which he invariably feels when he has done so, to precipitate himself into the street. The same patient informed him 'that upon one occasion, while at sea, he became tormented with an inclination to throw himself overboard. He maintained this contest for some days, and describes it as being the most harassing and distressing that can be imagined. When he first experienced it, he endeavoured to laugh himself out of it, but it would not do; he had recourse to every kind of distraction which he could contrive, but it was of no avail. It left him when he went below, but the moment he came on deck and looked at the sea, the same unaccountable

desire came on, and so worn out was he with the contest he was obliged to maintain, that he actually yielded to the incontrollable impulse, and threw himself overboard. He was perfectly aware of his danger, and was quite ashamed of what he conceived his own folly.'"[1]

"Mrs. Trollope relates the particulars of three women, who, at different periods, whilst under the influence of a momentary paroxysm of delirium, or suicidal frenzy, precipitated themselves from the spire of Strasburg Cathedral. One of the unfortunate creatures, says Dr. Pagan, was a young girl, and the first symptom of a disordered mind which she manifested was that of excessive mirth. She laughed and shouted as if in ecstacy, and, having reached a point where nothing impeded her view of the abyss below, she sprang from the giddy eminence, screaming wildly as she fell."

"Dr. Zimmerman relates the case of a peasant, born at Krumback in Swabia, who was often attacked with an irresistible inclination to commit murder. He felt the approach of the fit many hours, and sometimes a whole day, before its invasion, and, from the commencement of this presentiment, he begged to be secured and chained, that he might not commit some dreadful crime. 'When the fit comes on,' he says, 'I feel under the necessity to kill, even were it a child.' His parent, whom he tenderly loved, he declared would be the first victim of this murderous propensity. 'My mother,' he cried out with a frightful voice, 'save yourself, or I *must* kill you.' Before the fit he complains of being exceedingly sleepy; without being able to sleep, he feels depressed, and experiences slight twitches

[1] Haslam's 'Medical Jurisprudence of Insanity,' pp. 43-4-5.

in the limbs. During the fit he preserves his consciousness, and knows perfectly well that in committing a murder he would be guilty of an atrocious crime. When he is disabled from doing injury, he makes the most frightful contortions and grimaces, singing or talking in rhyme. The fits last from one to two days. When they are over he cries out, 'Now, unbind me. Alas! I have suffered cruelly; but I rejoice that I have killed nobody.'"

"At Bures, the wife of a butcher, forty years of age, of a nervous constitution, the mother of several children, of a mild and amiable character, endowed with good sense, who had always enjoyed good health, experienced anxiety of mind in consequence of the derangement of her affairs, of which her husband was a chief cause. One night she had a dream, and thought she perceived a cord, which she tried to seize in order to hang herself. On awaking she was silent, and had confused ideas, which soon fixed themselves in a project of strangling her children. She mentioned to her husband, shedding tears, this dreadful design, and requested that her children, and even the knives belonging to the trade might be put out of her sight."

"A young lady in one of the asylums of Paris experienced a violent inclination to commit homicide, for which she could not assign any motive. She was rational on every subject, and whenever she felt the approach of this dreadful propensity she entreated to have the strait-waistcoat put on, and to be carefully guarded until the paroxysm, which sometimes lasted several days, had passed."

"Mr. R—, a distinguished chemist and poet, of a disposition naturally mild and sociable, committed himself a prisoner in one of the asylums of the Faubourg St. Antoine, tormented by the desire of killing, he often prostrated him-

self at the foot of the altar, and implored the divine assistance to deliver him from such an atrocious propensity, and of the origin of which he could never render an account. When the patient felt that his will was likely to yield to the violence of this inclination (for it assumed an intermittent character) he hastened to the head of the establishment, and requested to have his thumbs tied together with a ribbon. This slight ligature was sufficient to calm the unhappy R—, who, however, finished by endeavouring to commit homicide upon one of his friends, and perished in a violent fit of maniacal fury."

"Maria Isabella Becket, aged 66, was indicted for the wilful murder of Jane Bowden, on the 30th of December last.

"The prisoner is a respectable-looking old lady, who at the time of the occurrence out of which this charge arose, was lodging at Wing with her son-in-law, Mr. Bowden. Near to their house lived Mrs. Becket, the wife of the prisoner's son, and it appeared that on the 30th of December the old lady paid the latter a morning call. Mrs. Becket welcomed her relative warmly, saying, 'Oh, mother, you have not been here since the alterations.' To this the prisoner, whose eyes glared wildly, replied with a sad and solemn voice, 'Yes, I am come, but not on a pleasant errand, for I am come to kill you. I must do it for I am mad,' and muttered something about her having been sent by the devil, who had given her a razor; at the same time she produced a razor from her pocket, and seized Mrs. Becket's arm. A scream and struggle ensued, during which the old lady said, 'Oh! I must do it;' but a second scream summoned to the aid of Mrs. Becket, who was far advanced in pregnancy, a neighbour, and by his

assistance the maniac was subdued and apparently pacified. After a while she said she was better, and went away, saying she could go alone. Although Mrs. Becket had observed indications of a failing intellect in her mother-in-law since her husband's death two years ago, neither she nor her friend accompanied the prisoner. On her return home she found the deceased, a child only ten weeks old, sleeping in a cradle rocked by an elder sister five years old. Mrs. Bowden was upstairs, and immediately after the return of the prisoner she heard a shriek from the girl, and on rushing down discovered to her horror the old lady, with the babe on her lap, deliberately engaged in the act of cutting its throat with a knife. The injuries thus inflicted on the child caused its death in a few minutes, as her distracted mother rushed out of the house with it in her arms. When taxed, with the murder the old lady said, 'I was forced to kill the baby in order that it might go to Heaven.' Both Mrs. Becket and Mrs. Bowden agreed in attributing this dreadful act to the impulses of insanity, and described the conduct of the prisoner for some time past as that of one labouring under a delusion, struggling with invisible spirits as it were, and whose intellect was failing. The medical man who had known her for several years spoke of her as hypochondriacal at times, and deposed that, in his opinion, the prisoner was of unsound mind at the time in question. She answered all his questions rationally enough, and had always taken to the child more than to her other grandchildren. On one occasion the prisoner said to Mrs. Bowden, she wished some one would kill her if he would not be hanged for it, and regretted that it was a sin to kill herself, and often expressed the fear that she should die in a workhouse, though her

circumstances were amply sufficient for one in her class of life.

"The Chief Baron left it to the jury to say whether they were satisfied by evidence that the prisoner, at the time she took away the life of her grandchild, was in a state of insanity, so as not to render her criminally responsible for that horrible act.

"The jury at once returned a verdict of *Not Guilty*, on the ground of insanity."[1]

"Georget details the history of a man named Jaques Monnier, who, after committing many acts of violence and fury, escaped from his family, and took to the woods. His flight having excited considerable alarm, several persons were despatched by the authorities after him. On arriving at a field, where many labourers were at work, at a distance from one another, Monnier first threatened a man who was driving a cart, and immediately after pelted another with stones. The latter having escaped, he rushed upon an old man almost blind, and beat him on the head with a large stone until he had killed him. He then attacked a man who was digging in a field, and killed him also, with a spade. A few moments after he met a person of the name of Prophetè, on horseback, whom he struck down with stones, but was obliged to leave in consequence of his cries. He then chased some children, who, however, saved themselves from his fury. On being examined during his confinement, Monnier said that he well recollected having killed the three men, and especially one, a relative of his own, whose death he greatly regretted. He added, that in his paroxysm of frenzy he saw nothing but flames, and the blood was then delightful to his sight. At the end of a

[1] 'The Times,' March 11th.

few days' imprisonment, he seemed to have entirely recovered his reason, but subsequently he relapsed. The court declined trying him, on the ground of insanity."

"Dr. Michu knew a country-woman, twenty-four years of age, of a bilious, sanguine temperament, of simple and regular habits, but reserved and sullen in her manners. She had been ten days confined with her first child, when suddenly, having her eyes fixed upon it, she was seized with the desire of strangling it; she carried the infant to the cradle, and went out, in order to get rid of so horrid a thought. The cries of the baby, who required nourishment, recalled her to the house, when she experienced a still more ardent impulse to destroy it. She hastened away again, haunted by the idea of committing so horrible a crime. She raised her eyes to heaven, went to the church, and offered up a fervent prayer for divine assistance. The whole day was passed by this unhappy mother in a constant struggle between the desire of taking away the life of her infant, and the dread of yielding to the impulse. She concealed her agitation until evening, when her confessor, a respectable old man, was the first to receive her confidence. He soothed her feelings, and recommended her to take medical advice. 'When we arrived at her house,' adds Dr. Michu, 'she appeared gloomy and depressed, and ashamed of her situation. Being reminded of the tenderness due by a mother to a child, she replied, 'I know how much a mother ought to love her child; but if I do not love mine, it does not depend upon me.' She soon after recovered, the infant having in the mean time been removed from her sight."[1]

"Gall states that he knew a woman who experienced,

[1] Haslam's 'Medical Jurisprudence of Insanity,' p. 47.

especially at certain periods (menstrual), inexpressible torture, and the fearful temptation to destroy herself and to kill her husband and children, who were exceedingly dear to her. She shuddered with terror as she described the struggle that took place within her, between her sense of duty and religion, and the impulse that urged her to this atrocious act. For a long time she dared not bathe her youngest child, because an internal voice said to her constantly, '*drop him in; let him slip.*' Frequently she had hardly the strength of mind to throw away a knife which she was tempted to plunge in her own and in her children's breasts. Whenever she entered the chamber of her children or husband, and found them asleep, she was instantly possessed with the desire of killing them. Sometimes she precipitately shut the door of their chamber, and threw away the key, to remove the possibility of returning to them during the night, if she should fail to resist the infernal temptation."[1]

The following cases prove that the homicidal propensity is not always an irresistible impulse, and that individuals subject to it sometimes remain still under the influence of moral motives.

"In a respectable house in Germany, the mother of the family, returning home one day, met a servant, against whom she had no cause of complaint, in the greatest agitation; she begged to speak with her mistress alone, threw herself upon her knees, and entreated that she might be sent out of the house. Her mistress, astonished, inquired the reason, and learned that whenever this unhappy servant undressed

[1] Ibid., p. 49; and Prichard, p. 29?

the little child which she nursed, she was struck with the whiteness of its skin, and experienced the most irresistible desire to tear it in pieces. She felt afraid that she could not resist the desire, and preferred to leave the house. This circumstance occurred about twenty years ago, in the family of M. le Baron de Humboldt, and this illustrious person permitted his testimony to be added."

"A French army-surgeon, naturally of a lively and cheerful disposition, became thoughtful and melancholy, in consequence of pecuniary difficulties. He was now frequently observed to be studying the Scriptures and reciting passages from the Bible. He was happily married, and had four children. One morning he summoned his wife and his children into the court of his house, and then informed them that it was his intention to kill them all, and afterwards himself. He descanted coolly on the propriety of homicide, and told his wife that she must be the first spectator of the destruction of her children, and then her own turn would come. She said she entirely coincided in the justness of her husband's sentiments, and cheerfully agreed to the proposed tragedy. But she appeared suddenly to recollect that it would be proper for herself, as well as her children, to confess and take the sacrament, previous to their appearing before their final judge. The monomaniac replied that her proposal was most reasonable, but that it would be *absolutely necessary* that he took *some person's life that day*. With this purpose in view he instantly set off for Salsbourg. His wife, having placed the children in security, made the best of her way to the town, and went directly to Dr. Otto, the friend of her husband, for advice. Her husband had already been there, and, not finding the doctor at home, had gone away. The woman now recollected, and

told the professor, that her husband had threatened *his* life for some imaginary slight; but at the time she thought he was in jest. About mid-day the monomaniac came back to the doctor's residence, and appeared quite calm and peaceable. The professor invited him to go and see the hospital of the town, where he had a curious dissection to make; and they sat down to take some refreshment before proceeding thither. At their repast, he told his host that he had lately felt an immoderate impulse to commit homicide, and that he had actually murdered a peasant that very morning on his way to town. He confessed also that he had entered a coffee-house for the purpose of committing a second act of the kind, but had been diverted from his purpose. The murder of the peasant, it was afterwards found, was a mere fiction. Dr. Otto now turned the conversation to other subjects, and on all other topics the man appeared perfectly rational. They now set off for the hospital, and on their way the monomaniac met an old acquaintance and fellow campaigner. While they were greeting each other, the monomaniac suddenly struck his friend a violent blow on the pit of the stomach, exclaiming, with a loud burst of laughter, that he had done for him, as he had hit the *cœliac plexus*. Dr. Otto reprimanded him in strong terms for this dishonorable and cruel act, at which the monomaniac seemed much surprised, and informed him that he was irresistibly urged to murder somebody, and cared not who was the victim. The professor then asked him, in a taunting tone, if he had not conceived a design against *his* life. The unfortunate man acknowledged it, but added that he had sufficient control over himself to preserve the existence of a benefactor. The doctor took his arm, and they proceeded to the hospital, where he was immediately confined. He

almost instantly became furiously maniacal, and in a few months after died." [1]

Dr. Haslam relates the following case:

"A woman about thirty-six years of age, who had been well educated, but whose life had not been exempt from some irregularities, in consequence of intemperance and manifold disappointments, had become affected with madness. She was by turns furious and melancholy, and conceived she had murdered one of her children, for which she sought to suffer death. She detailed the manner in which she had destroyed the child, and the motives which actuated her, so circumstantially and with so much plausibility and feeling, that if I had not known her child to be living, I might have been deceived. By her own hands she had repeatedly endeavoured to terminate her existence, but was prevented by constant diligence and due restraint. Her disposition to suicide was afterwards relinquished, but she still persisted that for the murder of her child she ought to suffer death, and requested to be sent to Newgate in order to be tried, and undergo the sentence of the law; indeed she appeared to have derived consolation from the hope of becoming a public example, and expiating her supposed crime on the scaffold. While in this state, and with a hope of convincing her of its safety, the child was brought to visit her. When she beheld it there was a temporary burst of affection; she kissed it, and for a few moments appeared to be delighted; but a look of suspicion succeeded, and this was shortly followed by a frown of indignation, which rendered the removal of the child a measure of wholesome necessity. Perhaps in no instance was the buoyancy of madness more conspicuous over reason, recollection, and feeling. She in-

[1] Ibid., p. 49.

sisted that they had attempted to impose on her a strange child, which bore a faint resemblance to her own; however, by such subterfuge she was not to be deceived; she had strangled the child until life had wholly departed, and it was not the order of nature that it should exist again. The effect of this interview was an exasperation of her disorder; she became more cunning and malignant, and her desire for an ignominious death was augmented. To render this more certain, and accelerate her projected happiness, she enticed into her apartment a young female patient, to whom she appeared to be attached; and having previously plaited some threads of her bed-quilt into a cord, she fixed it round the neck of the young woman, and proceeded to strangle her. Fortunately some persons entered the room in time to save her. When this unhappy maniac was questioned concerning the motive which induced her to attempt the destruction of a person for whom she had manifested kindness, she very calmly replied, that as the murder of her own child was disbelieved, she wished to exhibit a convincing proof of the ferocity of her nature, that she might instantly be conveyed to Newgate and hanged, which she desired as the greatest blessing. With considerable satisfaction I may add, that in a few months, notwithstanding that her derangement had been of three years' duration, this woman perfectly recovered, and for a considerable time has performed the duties of an important and respectable office.

Influenced by curiosity, and a wish for the advancement of professional knowledge, I have always been induced to scrutinize as deeply as possible into the feelings of lunatics who have perfectly recovered. I therefore wished to be informed from this patient in her sane state what were her feelings and opinions concerning her former condition·

She had recollected most of the circumstances which had transpired during her illness, but she was unable adequately to comprehend, or to give any account of her disorder. It seemed to her a wearisome and protracted dream, but more distinct and connected. She almost doubted, with her present feelings, if she could be the same person, to have entertained opinions and resentments so different from her natural character. When questioned concerning her attempt to strangle the young woman, she rejoiced that no fatal consequences had ensued, yet she seemed to attach but little responsibility to anything she might have committed in the frame of mind. Death, from which, as other human beings, she now shrank with horror, was then the most desirable of all events. Respecting the child, she observed, her mind was as suddenly seized with the conviction that she had destroyed it, as a person is attacked with the shivering fit of an ague, and feels the sensation of cold in the hottest day in summer. On inquiring if these former impressions often recurred to her, she replied in the negative; that although she could accurately recollect them when questioned, yet they now seemed removed to a vast distance from the natural range of her thoughts, and that she found herself pleasantly occupied in contriving plans for the welfare and happiness of her future life."[1]

"Henriette Cornier, a female servant, twenty-seven years of age, was of a mild and lively disposition, full of gaiety, and remarkably fond of children. Suddenly a singular change was observed in her deportment; she became silent, melancholy, disturbed in thought, and finally sank into a state of stupor. This was in the month of June. She was dismissed from her place on account of her mental

[1] Ibid. p. 52.

dejection, and in the month of September endeavoured to commit suicide. In the following October she entered into the service of a Madame Fournier, still desponding and melancholy. On the 4th of November she suddenly conceived the horrible purpose of murdering the child of a neighbour. Her mistress had gone out to walk, and ordered her to prepare dinner at the usual hour, and to go to a neighbouring shop, kept by a woman of the name of Belan, to buy some cheese. She had often been to the shop before, and had always manifested great fondness for Belan's little girl, a beautiful child, nineteen months old. On this day she displayed her usual fondness for it, and persuaded the mother, who at first was rather unwilling, to let her take it out for a walk. Cornier then hastened back to her mistress's house with the child, and, laying it across her own bed, severed its head from its body with a large kitchen knife. She subsequently declared that while executing this horrible deed she felt no particular emotion either of pleasure or of pain. Shortly after, she said, the sight of the horrible spectacle before her eyes brought her to herself, and she experienced some emotions of fear. At the end of two hours, during which time she had remained chiefly in her own room, Madame Belan came and inquired for her child from the bottom of the staircase. "*Your child is dead,*" calmly replied Henriette. The mother, who at first thought she was in jest, soon became alarmed, and rushed forward into the chamber, where she beheld the mutilated and bloody fragments of her child. At that moment Cornier snatched up the head of the murdered infant, and threw it into the street through the open window. A crowd of persons rushed into the room, where Henriette was found sitting on a chair near the body of the child, gazing at it,

with the bloody knife by her; her hand and clothes stained with gore. She made no attempt to escape, nor to deny the crime. She confessed all the circumstances, even her premeditated design, and the perfidy of her caresses, which had persuaded the unhappy mother to intrust her with the infant. It was impossible to excite in her any sentiment of remorse or grief. "*I intended to kill the child,*" was her constant reply; adding, the idea had taken possession of her mind, and that she was "*destined to do it.*" When asked why she threw the head out the window, she answered that it was to attract public notice, that people might come into the room, and see she alone was guilty. This unfortunate creature was tried on the 27th of February, 1826, when the medical witnesses declared that though they could not adduce any positive proof of her insanity, yet they were equally unable to pronounce her sane. She was again brought to trial on the 24th of June, when the jury returned a verdict of guilty of committing homicide voluntarily, but not with premeditation, and she was sentenced to hard labour for life."[1]

"Dr. Mareschal relates the case of a lady unhappily married. She had a child whom she nursed for a period of three months, at which time she became melancholy, and was often seen in tears. One day, when sitting near the fire, she exclaimed with eagerness and agony, 'Snatch the child from me, or I will throw it in the flames.' She then confessed that for a long time she had been struggling against an almost irresistible impulse to destroy the child, and that on approaching a window or fire the desire always revived. The infant was taken from her; she became melancholy; and, lamenting her unhappy propensity, at-

[1] Ibid., p. 56.

tempted suicide. She recovered, but in three years afterwards had a relapse; and in the second month of nursing was seized with the same unnatural propensity, and after resisting its force for some time, again parted with the child, and, horrified at her own condition, repeatedly tried to commit self-destruction."[1]

WANT OF WILL, AND WANT OF MEMORY CONJOINED.

Lord Hale's case.—"In the year 1668, at Aylesbury, a married woman, of good reputation, being delivered of a child, and having not slept many nights, fell into a temporary phrenzy, and killed her infant, in the absence of any company; but, company coming in, she told them she had killed her infant, and there it lay. She was brought to gaol presently, and, after some sleep, she recovered her understanding, but marvelled how or why she came thither. She was indicted for murder; and, upon the trial, the whole matter appearing, it was left to the jury, with the direction, that—if it did appear that she had any reason when she did it, they were to find her guilty; but if they found her under a phrenzy, *though* by reason of her late delivery and want of sleep, they should acquit her; and that had there been any occasion to move her to this fact, as to hide her shame, which is ordinarily the case of such as are delivered of bastard children, and destroy them; or, if there had been jealousy of her husband, that the child had been none of his; or, if she had hid the infant, or denied the fact, there had been evidences that the phrenzy was counterfeit. But none of these appearing, and the honesty and virtuous deportment of the

[1] Ibid., p. 59.

woman in her health being known to the jury, and many circumstances of insanity appearing, the jury found her not guilty, to the satisfaction of all that heard it."[1]

DELUSION, WITH DEFECTIVE WILL.

About the end of June, 1851, Dr. P— accidentally called the attention of the writer to a case under his treatment.—Alfred S—, a plasterer—in which the writer discovered nervous symptoms to exist indicating a tendency to insanity, and which had not been suspected by any one. An examination was made, without allusion to his state of mind, he having consulted Dr. P— for a bodily ailment; after a little time he was recalled, when the writer inquired, 'Are you on good terms with your wife?' He replied, 'Yes; she is a good and affectionate wife, and I have every reason to be satisfied with her conduct, and to be happy in my home; but I have a fearful tendency to murder her, and frequently can scarcely resist the attempt, especially when I awake in the morning. This morning I sat up in bed, looking at her, and contemplated the act of destroying her, and have often done so before; and I avoid doing it by hurrying from my home, and walking a great distance, when my feelings become composed and calmed.' The writer asked, 'Have you any motive for this propensity?' His reply was, 'None whatever. My wife is kind, attentive, and affectionate.' 'Have you any reason for jealousy?' 'None whatever; and although I unjustly suspect her, I believe her to be true to me.' 'Have you any similar feelings towards any one else?' 'Yes; I have

[1] 'Historia Placitorum Coronæ,' by Sir Matthew Hale, v. i, p. 36. (Exchequer.)

frequently the most horrible apprehensions and a tendency to destroy my children, and get away as fast as I can from the house to prevent my doing so.' Upon this confession of his state of mind, the writer plainly explained to him that he was no longer a responsible agent; and which, after fully and cautiously urging upon his attention the dreadful consequences that might result, told him to go home and tell his wife. He said, 'Must I tell her that I am mad?' To which the reply was, 'No; your senses are diseased. Go to the surgeon at Bethlem Hospital, tell him who sent you, and state exactly your case, and you will be admitted and be cured; and, in the interim, whenever you feel these propensities, rush from your home, and walk rapidly many miles.' This suggestion was made in much doubt of his carrying it out, and painful misgivings of what might happen were entertained. He, however, implicitly followed this advice; was admitted at Bethlem, and was discharged cured after about three or four months' treatment.

In this case, the patient comprehended the difference between right and wrong, but was not a responsible agent, since the function of will was depraved, and he was the victim of delusions, which placed his case in the category explainable by the physiological test No. 1.

Subject to legal constructions undoubtedly, this man would have been held responsible before the law for any criminal act he might have perpetrated, since no suspicion of insanity had existed in his case, and no taint could be traced, upon inquiry, of latent insanity or epilepsy existing in his family; and, although incapable to contend against the perpetration of crime, he would probably have deplored its dreadful consequences. The mental ailment occupied but little the attention of this patient, and had not

he been directed to it, would have passed by him unregarded, as having no relation to his bodily disease.

The following case strongly exemplifies the absence of *will*, and its cruel consequences:[1]

"Of the four cases of moral insanity included in the preceding table, one presented some features of peculiar interest in a medico-legal point of view. It was that of a female labouring under a powerful homicidal impulse. *She had no disorder of the understanding, nor perversion of the intellectual power, and, in particular, she laboured under no delusions or hallucinations.* She had a simple abstract desire to kill, or rather, for it took a specific form, to strangle. She made repeated attempts to effect her purpose, attacking all and sundry, even her own nieces, and other relatives; indeed, it seemed to be a matter of indifference to her who she strangled, so that she succeeded in killing some one. She recovered, under strict discipline, as much self-control as to be permitted to work in the wash-house or laundry; but she still continued to assert that 'she must do it!' —that 'she was certain she should do it some day!'—that 'she could not help it!'—that 'surely no one had ever suffered as she had done!' 'Was not hers an awful case?' And, approaching any one, she would gently bring her hand near their throat, and say mildly and persuasively, 'I would just like to do it!' She frequently expressed a wish that all the men and women in the world had only one neck, that she might strangle it. Yet this female had a kind and amiable disposition; was beloved by her fellow-patients: so much so, that one of them insisted on sleeping with her, although she herself declared that she was afraid she would not be able to resist the impulse to get up during the night

[1] Prichard, 'On Criminal Insanity.'

and strangle her. . . . *This female was perfectly aware that her impulses were wrong*, and that if she had committed any act of violence under their influence she would have been exposed to punishment. She deplored, in piteous terms, the horrible propensity under which she laboured. . . . During the former attack of insanity she had attempted suicide. The disease was hereditary. Her sister and mother both committed suicide."

It is more than doubtful if the dogma propounded by Baron Pollock, namely, "That lunatics should not be confined in asylums till they have become dangerous to themselves or others;" is not both mischievous and full of error. It is unsafe to declare any lunatic absolutely not dangerous, and we are unable to know when he will become irresponsible and criminal. The mildest and most amiable lunatics have committed fearful and sudden homicides; their conduct under seclusion and retirement, during which they are removed from, and repressed on the earliest manifestation of excitement, and are constantly under observation, is no criterion of their responsibility, restraint under such circumstances being ready to be applied at once, and they are thus reminded of the condition and punishment attending homicidal or insane impulse, and will practise forbearance and self-control under this discipline, although the effort be visibly manifest.

Legal, or magisterial interposition ought to be allowed, when possible, in the incipient state of madness, long before the state of total irresponsibility has arrived, to prevent the commission of mad crime, and which would probably avert the necessity for their interposition in a penal character, after aggravated criminal acts may have infringed upon social and domestic rights and security.

This interposition of legal prevention and restraint would

very much facilitate jurisprudential inquiries and decisions, since it is probable, that many cases arraigned before the criminal tribunals of the country, for grave offences against law, life, morals, or property, under such circumstances, would have been previously arraigned before the minor tribunals, if such had existed, and would have been taken cognisance of, at some earlier time, for less offences, and for small misdemeanours; and in that case, authentic records would have been made, and might be referred to, of the tendency, and of the extent of crime, in such early and incipient stages of disease, not for the purpose of punishment, or abridgment of personal liberty, but for the intervention of medical treatment, before any invasion of social rights had been perpetrated, or before any moral crime had been committed, and also, before confirmed habits of disease had become established; and by this means future judgments, would become relieved from the doubt which often exists, and they would be rendered more satisfactory and conclusive; and every case of aggravated assault, attended with unusual circumstances, should be carefully and minutely recorded; and thus the polity of madness would be greatly improved and advanced.

This surveillance and intervention of the law, would tend to discipline such patients to practise some restraint, which from a consciousness of being considered mad, and which condition, being familiarly observed and remarked upon, makes them reckless and irresponsible, and also excites evil passions, and often leads to homicidal acts. Thus the lunatic would have before him the fear of the law, and the apprehension of its consequences, by which he no doubt, to a great extent, would be influenced.

The ability to resist the impulse of insane crime, is after

the ratio of the strength and consistency of the mind, and has but slight reference to the degree of mildness, intensity, or violence of the *emotions* manifested; and which circumstance renders such cases more subtle and dangerous. If there should remain, a tolerable degree of strength and consistency in the mechanism of the mind, this state is not expressed, by the greater or less degree of the emotional manifestations, so as to indicate its mildness or malignity. One patient with the worst degree of excited emotion, shall resist the access of criminal impulses, while another with the mildest error, amounting only to eccentricity, shall never be able to resist their influence; and this shall be perceptible through every shade, from eccentricity upwards. The inveterate liar, is a mild instance of the one species of error, frequently manifested at the early gift of speech and comprehension, and rarely or never cured; while the insane homicide is the other: but homicidal madness is fortunately of rare occurrence, except amongst idiots and epileptics, and will seldom arrive at the crowning point, if the health, be not greatly impaired and neglected.

In the same category may be considered physical disease; when its *continuous* type is broken, and the condition of remission, or intermission is favorably set up, the degree or amount of intensity of the disease is for so much lessened, and it becomes subjective; but it remains latent for a return of its exalted condition, which may depend upon, or be induced by improperly, or too early ceasing the use of therapeutic agents, or not sufficiently using them; or on the renewed application of exciting causes of disease, or by the use of improper diet and regimen; and every relapse becomes more dangerous to the powers of life, in the physical, as it does to the powers of the brain, in mental disease; and *lucid intervals*, as has

been observed, may be considered the remission or intermission of madness, and the pathognomonic sign, of subjective or recoverable madness; or of that condition which is free from organic lesion: since organic lesion, in its extreme manifestation, produces an entire privation of mind, such as idiocy, fatuity, dementia, or imbecility, and which states constitute the few instances in which lucid intervals are scarcely ever present.

We have secondary courts of inquisition for all kinds of delinquencies, namely, police courts for assaults, misdemeanours, burglary, swindling, breach of contracts with servants, and for wandering lunatics. Coroners' courts to inquire into homicides, and fire raisings; and courts of inquisition in civil lunacy; but, by a strange anomaly, there exists no secondary court, for the investigation of what is called *criminal lunacy*, (a term which expresses, and implies a contradiction), through which, if such courts existed, the public mind would become familiar with madness, in that nascent, and incipient state, in which, it is unfortunately least considered, and most easily remedied. And under such auspices, curative institutions would grow up under magisterial sanction and authority, inspired by a healthful and hopeful humanity, and madness would come under medical treatment in that condition in which the practitioner, to his great disadvantage, never meets with it.

We have also every kind of probationary institution,—reformatory and ragged schools, asylums for females destitute, or debauched; for idiots, and for widows and orphans, and reformatories for young thieves; but there exists no neutral ground for the incipient homicidal lunatic, between the enjoyment of his social *status*, and the bar of the criminal: this certainly is not an example, or elucidation of our high civilization.

Thus, in most of the homicides recently committed, particularly in the instance of the man Miller, at Bath, who murdered Mr. and Mrs. Border, madness had been sufficiently manifested by delusions, and in Miller's case by delirium, to have demanded the strictest surveillance, and to have excited the strongest suspicion of his state; which had a court possessing powers of preliminary inquiry existed, this catastrophe might have been averted. The same observation applies with equal force to the cases of Hadfield, Howison, Brooke, Feldtmann, Louis Lecouffe, L. A. Papovoine, and of the man Blackwell recently committed for trial, and to which case we have before alluded.

Considering the numerous instances of homicide daily occurring, committed by lunatics, this question has become ripe for the legislature to enact humane and prompt means of protection for the community, as well as for the care of the lunatic: and this becomes the more imperative, since for other delinquencies prevention can be practised, and the prevention of crime is an important element in our social policy; but madness exists not only unlicensed, like crime, but different from crime, it is incapable of being prevented. The lunatic is like a stranded vessel bereft of sails, with naked spars and stalky masts raised to averted heaven; he is no longer regarded by man, and presents a spectacle of desertion, desolation, and helplessness.

When will, memory, and understanding are impaired, perception and consciousness become also impaired, and the ideas secreted in the brain become erroneous, and the experience and knowledge which has become stored in the mind, are no longer manifested regularly and consecutively, but become converted into a state of chaos, like a store-room, erewhile, well arranged with all kinds of valuable stores,

broken into, and scattered about promiscuously into a state of disorder and confusion.

The elements of madness, namely, mania, illusions, delusions, and lucid intervals, may exist in a greater or in a less degree. Thus, mania may be so slight in its manifestation, and so transient, as to be of little importance; temporary illusions, may also exist without any meaning, since in all other respects the patient may be reasonable; and delusions may exist, which if not acted upon, are of no signification or importance, and are very often entirely harmless: but, on the other hand, *lucid intervals* are always treacherous and suspicious, and a lucid interval must be considered a masked and latent condition, ready at any time, and at all times, to explode, at the moment least expected, and on the smallest excitement: and lucid intervals, constitute the true ingredient and staple, and are the most unerring index of madness.

If we are in doubt, and seek for exemplification of what mind and intellect consist, where shall we find manifestations of both, better than amongst those direful scenes recently witnessed at Delhi, Cawnpore, and Lucknow; and, than in those painful histories recorded, which under prevision of a torturing martyrdom, suspended for days over the agonized victims, the human mind, vindicated its superiority over material things, by stoical resignation: with the sickening delay of a fate distinctly foreshadowed, training, discipline, and a hopeful Christianity nevertheless sustained the victims throughout. Wives, soliciting to die with their husbands and children, and courageously submitting to torture and death!

The *irony* of despair, uttered in those thrilling syllables, by the heroic girl at Cawnpore, will ring in the ear of

justice and humanity, until the final doom of vengeance: "Go in, and see how nicely I have wiped the Resildah's legs;" and then the noble girl gave herself to self-sacrifice. The suggestion is, that this was insanity,—be it so; a composed mind could not exist under the indignities inflicted, and which brings the mad condition, within the range of inspired beings, contended for by some; and if the instinct this noble lady manifested, was not *rational, it was Godlike.*

"This the noble nature, whom passion could not shake."—OTHELLO.

TREATMENT.

"Virtute vicit incommodum naturæ."—CICERO DE FIN.

THE pathologists of the end of the seventeenth and beginning of the last century, although impeded by the humoral, and chemical doctrines, aimed and persevered with an earnest search after knowledge. So long as we retain the remembrance of Morgagni, Boerhaave, Hoffman, Gaubius, Sydenham, and Haller, not to name the greatest and first of all, the immortal William Harvey, *"Clarus arte medendi,"*[1] our faith in medical art must survive, from admiration of their indefatigable investigations, made under every discouragement.

The schism of the present day, revives the long neglected hypothesis of *Stahl,* sanctioned in his time by the learning, novelty, and ingenuity with which it was advanced; but its revival, depending entirely upon *nature* and *expectation,* to fulfil what art perseveringly applied, is intended to effect, would give colour to the conviction, or apparent conviction, that *there is no disease,* or, if there be, that nature without further trouble will remove it, through the agency of the *vis conservatrix naturæ;* and it thus retrogrades the art and science of medicine, a *hundred years* in its experience, and still more remotely throws it back, in its results and practice.

[1] Quintill.

Some of the followers of this defunct hypothesis are largely trusted; and it has extended where it should have been impossible, since it discounts art and intelligence in the lowest market, and destroys faith in the mind of the medical *neophyte*.

Without disparaging the experience of those, who in their devotion to nature, have no faith in art, we may say that by such their office becomes extinct and inept; and should a system (if such it could be called) dependent upon nature and expectation prevail, it would effectually destroy investigation, and would lead to the total inefficiency and degeneration of medical practice; and *we* would rather say, in the words of Quintillian, "*ars est, quæ disciplinâ percepi potest.*"

In the face of the denial of the utility of art, early experience, unfamiliar with disease, becomes paralysed and intimidated at the thraldom thus imposed upon reason and experiment; but the attribute and load-star of the human mind, *freedom of judgment*, must be asserted and maintained, or we must tamely submit to the false accusation that, in medical practice, we have no medium *between a bold empiricism*, and a *paralysed* and *prostrate* inaction, and are ignorant of a successful mode of treatment of inflammation, fever, and acute disease, and are only to be trusted to tinker with common place and empirical remedies, in *chronic* and *incurable* diseases—propositions both injurious and untrue.[1]

In opposition to this slavish doctrine, we find the triumphs

[1] "In practice, there should be no such thing as boldness or timidity: boldness is an ignorance (for we must not suppose a recklessness) of the harm which too strong means may do a fellow-creature; and timidity is an ignorance of the efficient means which remedies afford of relieving human suffering."—'Principles of Medicine,' by A. Billing, M.D., &c., Advertisement to the 3d Ed. p. xii.

of art, on all occasions are most excellent, when applied to subdue and convert nature, and nature is the material, upon which art best displays its highest achievements.—"*Ars dux certior quàm natura.*"[1] Objects in nature and art, which observe periodicity and order, forcibly appeal to the imagination. Thus, the sun, the moon, the seasons, day and night, equally with a clock, a watch, or a steam-engine, obtain the admiration, and almost the adoration, of the savage; displaying in both instances, the ascendency of nature and art;—nature manifests the most profound and inscrutable art; and art, which is a reflection of nature in its exactitude and precision, approaches, when most cultivated, nearest to nature, and satisfies us of its sufficiency for human wants: and we should hold faith in art, science, and nature, to foster the undying hope, which throws its forward shadow into eternity.

It demands unusual self-abnegation, to desert a field in which so many have laboured, whose virtues and skill have elevated them to a kind of idolatry, and to an equality with the gods of antiquity, especially when we find that the teachers of this creed, cling to a few slender twigs of medical practice, to maintain the distinctions, and position they have obtained by literary eminence.

The medical office, is enlisted against a cruel and truculent foe, and we must use every weapon, device, and stratagem which ingenuity can suggest, bearing in mind that if for a time the destroyer may be silenced, he will nevertheless remain unaltered. And under the tutelage above condemned, the healing art would descend from the rank it has held, and its fate on a small scale would represent a similar misfortune, the precursor of the decline and fall of

[1] Cicero de Fin.

races, civilization, science, and art. But the history of mankind is a living record of the triumphs of art, as witnessed by the greatest names.

It is true that medical practice, has not arrived at the standard of high art, which science demands, and of which she is capable, nevertheless science steadily progresses, and art cannot halt, but must inevitably follow in her wake. It is not that art is inefficient, or insufficient, but that we have not explored her secrets, and availed ourselves of her resources to extend and improve medical knowledge, although, notwithstanding our tardiness, she is waiting our behests.

Thus, in the use of the metallic salts of mercury and arsenic, and of the iodides of potassium, and other therapeutical agents, we are surrounded by uncertainty and empiricism, and through which, their great virtues have become depreciated and unjustly denied. Each of these remedies obtain, in their action upon the animal system, a *cumulative* power, not determinable within defined limits, or to be surely anticipated, and the action of which is not measurable, since vital statics, are not at present understood.

They consequently induce two sets of actions; the first, which is the curative one, being *tonic, reparative,* and *sedative,* but excited slowly or quickly, more or less, under certain constitutional, and also under certain local and personal conditions, such as diathesis, climate, and electricity. The second is a destructive and disintegrative action, and commences, when vital resistance is subdued, and when the heart and the vascular system is weakened: and when this *cumulative* force, has thus become developed, and has obtained ascendancy, the vital resistance ceases altogether, and the curative action becomes suspended, or a new type of disease supervenes; and it is worthy of remark, how little

will prevail against, and subdue acute inflammation, and of how much the phenomenal *sequelæ*, are traceable to morbid sensibility, imitative of acute inflammation, inducing a state of irritability which, if (and which is sometimes mistakenly practised) further depletion be used in its treatment, will certainly prove fatal.

Our terms to express the action, and reaction of medicines upon the vital forces, which are always varying in degree and intensity, are unmeaning and indefinite, such as the term "alterative," for if the vital tension be lowered to a certain point, other forces obtain ascendancy, which vitality resists as long as it is able.

A similar destructive, and adynamical action from *cumulation*, is possessed in the vegetable kingdom, manifested especially in the foxglove plant, which induces the *digitaloid* disease, in which *salivation*, and inflammation, and ulceration of mucous membrane, and other phenomena, produced peculiarly by the mercurial salts, are also induced. Dr. Billing says, "Iodine, arsenic, and sulphate of copper, occasionally produce *ptyalism*, and are otherwise analogous to mercury in their action.[1]

The term "sedative" is also very indefinitely used: if we concede, that there exists in nature a principle or condition which we may term *sedation*, then the term "sedative," may be applied to express the state of *quiet* and *rest*, produced by the action of medicines, or which exists spontaneously. *Sedation*, may be considered to be a *condition*, characterised by *inertia*, and which offers a passive resistance to other forces, and is opposed to inflammation, and also probably to electricity; and perhaps it resists chemical action, but it assimilates more nearly to *gravitation*, or magnetism in its action.

[1] 'First Principles of Medicine,' by Archibald Billing, M.D., &c., p. 99.

A state of healthful *sedation,* implies that organic *tension,* which sustains the *vital equilibrium,* and a certain amount of sedation is necessary to health, and its absence always brings disease, especially *nervous* disease, and also so-called inflammation. Sedation is, therefore, a conservative, tonic, and aggregative principle, which restores nervous power, and also through it the vascular power, when they become exhausted.

The appetite of sleep,

"Kind nature's sweet restorer, balmy sleep."

which physiologists have hitherto considered with singular indifference and inconsequence, in comparison with other animal functions and appetites, accumulates sedation, and may be considered, its *excitant* or *generator;* and the function of sleep, which is as periodical, invariable, and unceasing, as any other vital function, and is as necessary to animal life, is a condition of sedation. And many reptiles and other *hybernating* animals, during their torpid state, are enabled to resist the most intense cold, and also privation of air and food, by aid of the principle, or force which sedation represents.

Sleep, is as much an appetite and want of nature, as is hunger, and thirst, and the penalty of the forbearance, or abstinence from it, or of vigilance, is as certain and arrives nearly as soon as does the penalty of starvation, or the penalty of thirst. Will is always suspended during *sleep,* in short, sleep is a suspension of will. But the organic and vegetative functions are uninfluenced, and act independent of sleep, or equally asleep and awake, and we thus infer, that sleep is a certain condition of the vesicular neusine in which *coma* becomes generated; and when a state of exhaustion of the neuric fluid, occurs in the cerebral cells of the brain, the fluid must again become restored and accumulated afresh, before the brain can act, with healthful

vigour in the performance of its mental functions by the intervention of sleep.

The blood which supplies the brain influences it powerfully, and suspends its function quickly, if it be charged with too much *carbon*, or too little oxygen, or from *anæmia*, or *hyperæmia*.

"The period of a diurnal revolution is shared between sleeping and waking: during six or eight hours of the twenty-four, consciousness appears suspended. After a day spent in active exercise, the limbs feel fatigued, the mind is less lively, and less capable of continued attention, the senses become duller, we seek to dispose the body in a posture requiring the least muscular effort to sustain it, we withdraw the mind from reflections calculated to excite its powers, we seek to close the avenues of sensation, the images before the mind becomes more and more faint, and by insensible gradations we become unconscious.

"During sleep, the circulation is more gentle, the respirations are less frequent and are deeper, the temperature is lowered, the cutaneous transpiration is increased.

"The sleeper perhaps remains for several hours without motion, undisturbed by the loudest sounds or the brightest light."

"The mind quickly recovers its wonted character, the memory of the events of the preceding day returns, but with it, in most cases, no recollection presents itself of a state of consciousness between the period of falling asleep and that of waking. Among the instances in which the memory affords no evidenee of the existence of consciousness during sleep, some are nevertheless attended with phenomena, which distinctly show that consciousness has not been entirely suspended: for that, I may not mention

breathing as an evidence of *voluntary motion* (it being no doubt disputable whether each act of inspiration be voluntary or proceed from an automatic influence), a person asleep will sometimes turn his head from the light, or shift the position of a limb, or of the body, when it is reasonable to suppose that it has become inconvenient: many animals likewise sleep in postures in which they cannot be sustained without the measured employment of involuntary muscles."[1]

Dugald Stewart says, "The will loses its influence" (during sleep) "over those faculties of the mind, and those members of the body, which during our waking hours are subjected to its authority."[2]

We are accustomed to associate with the term "sedatives," medicines and remedies which sooner exhaust nervous power, and the power of the heart and vascular system, and which produce tenuity, rather than tension of the vital principle; nor is our knowledge of these, and of the other order of remedies called *tonics*, much improved by attributing their actions directly, and mechanically to the capillaries, and nervous and membranous fibres, as advocated with great ingenuity by Dr. Billing, since they can only reach them through the organic system, and must have undergone decomposition in the *primæ viæ* long before they could have reached the lymphatic, or capillary vessels.

Although remedies act, some as tonics upon these structures, and others as sedatives, yet this effect is produced by influencing the *vital* principle, through the heart and nervous centres. So long as the *vital* force prevails, and

[1] 'Outlines of Human Physiology,' by Herbert Mayo, F.R.S., &c.

[2] Stewart, 'Philosophy of the Human Mind,' v. i, p. 350.

enjoys its full integrity, other forces, as the *physical forces*, are subjective, and certainly mechanical agents can have no avail; but when the vital principle becomes impaired, then the latter encroach, until, by the extinction of vitality, they obtain complete dominion. Thus, the depreciation of vitality, renders it more or less amenable, to the influence, and exposes it to the encroachments of other forces, and when the physical forces obtain ascendancy, disintegration and dissolution commence.

The chemical doctrine continues a favourite field of inquiry, as it was in the time of Stahl and Boerhaave; and Lord Bacon was the first to appreciate the large number of facts it offers for investigation. And although it affords a magazine of facts and materials, yet it is insufficient of itself to explain the phenomena of disease, its researches serving better to investigate organic matter than vital actions.

Medical authority, in the treatment of disease, within the last thirty years, is almost exclusively derived from the experience and practice afforded by cities and large populations. The results of the experience thus obtained, amongst subjects, in whom the vital conditions are deteriorated, by an impure atmosphere, unnatural mental and bodily labour, intemperance, excitement, and want of rest, acting upon a low condition of vitality, prevalent amongst large populations, are that they induce derangements of the functions of *assimilation*, and very seldom develope *acute* or inflammatory diseases; and under such circumstances we rarely see vigorous disease, attack subjects in a previous state, of vigorous and sound health, which obtains under more favorable and healthful local conditions.

The value of *human life* in large towns, is far below

the average which the age would indicate, and gives, under such circumstances, a character of *senility* to the human constitution. Thus, where robust diseases are never manifested, robust remedies should be cautiously administered; notwithstanding the vital powers, in young and middle-aged subjects, even under such circumstances, rally with wonderful elasticity and buoyancy, when disease is relieved by remedies, and some conditions of disease, can only be subdued by a decisive practice.

A better arrangement of the knowledge obtained of the action of medicines, and a more painstaking, and strict enforcement of a correct manipulation is wanted. And we should bear in mind that the therapeutical art consists very much, first, to endeavour to find out a remedy, and next, to determine with how small a portion, or quantity of it we can accomplish our purpose, or cure disease; not to revel in the possession of our resources, or amongst the temptations of many *agents*, but endeavour to determine and limit the circle of remedies, to the *minimum* in *number*, as also to the *minimum* in *quantity;* and a well considered periodicity, in the administration of remedies is of high importance.

Dr. Billing's hypothesis, of the *tonic* action of the metallic salts upon the extreme vessels, in inflammation, and fever, and also especially of the tonic action of arsenic and mercury, which gives to them a specific virtue in febrile and some adynamical conditions; and, again, the peculiar sedative agency, of large doses of calomel in *congestive fever*, which the author has witnessed with great satisfaction during many years' experience of its singular efficacy;—and the agency of the iodides of potassium, have not been sufficiently investigated, or placed in their proper therapeutical

relations, but their value as remedial agents is indisputable. And these remedies, especially require the most observant, and cautious attention to manipulation, combination, and exactitude in the division of the quantities administered, and upon which their virtue and safety depend.

There are no medicines which act so directly, and uniformly upon the absorbent system, and lymphatic vessels, as do the chloride, and bichloride of mercury, and their agency is now become easily measured; and as an alterative on the one hand, and a sedative as well as an alterative on the other, the chloride is an invaluable remedy. The chloride in a full dose, either alone or combined with an equal quantity of Pulv. Jalap., to the extent for an adult of eight grains of each, if its agency be allowed to remain undisturbed, and quietly in the system for twenty-four hours, is decisive and satisfactory; after which it may be carried off, by administering the sulphate of magnesia, or other neutral salts; or rhubarb and magnesia, for that purpose.

The secretions become, by this appeal to the absorbent and lymphatic system, copiously and insensibly determined, and carried into the intestinal series in large quantities, charged with morbific matters, and the relief resulting to vitality from which, produces a curative and sedative influence. One dose, in the above proportions, administered in *Asiatic cholera*, never fails to restore the vegetative and ganglionic functions, so singularly collapsed and prostrated, which they are always found to be in those cases; and functional secretions from the skin, liver, and kidneys, which before were entirely suppressed, presently take place; the same occurs in congestive *typhus*, and in which cases large doses of calomel induce a state of profound sleep, which may have been previously entirely absent; and in place of which a state of unconsciousness may have previously existed, with the eye-

lids partially opened, and accompanied with bed-picking, and either burning heat upon the dried skin, or a goose-flesh skin, with complete *rigor*, or *collapse*.

Its agency, in the same dose, is equally efficacious in every kind of visceral inflammation and obstruction; and it is also peculiarly useful in most cases of *dysmenorrhœa*: which leads to the conclusion that by determining the morbific secretions, into the intestinal series the relief is thus obtained.[1]

To familiarly elucidate and explain disease, we might for that purpose assume an imaginary *graduated scale*, making health the middle point from which the scale should ascend *above* health, till it arrived at the *figure* which should denote *death*; and again, to descend at the opposite extremity of the scale *below* health, till it arrived at the figure, which may again represent *death*. This imaginary *biotometer*, is suggested as a crude and fanciful measure, serving to show the intermediate degrees, which might be thus indicated, on the ascending and descending scales, of increased, or diminished degrees of vitality, to arrive at the central point of health, progressing, at each extremity of the scale to *death*, from different conditions of vitality, and thus helping to denote the intermediate derangements, and diseases, either from excess, or deficiency of vital action.

PHYSICAL FORCES.

The *physical forces*, or the so-called *imponderable bodies*, in the investigation of which, Sir Michael Faraday and Mr.

[1] The author during a long practice, has always found *tartarized antimony*, the *chloride* and *bichlorides of mercury*, either alone, or in combination with *foxglove* (the tincture preferred in doses of fifteen drops) capable of subduing inflammation without resorting to the *lancet*, and only occasionally even to topical blood-letting; *and even the necessity of using these remedies, may become anticipated, or superseded, by the adoption of the preceding practice.*

Grove, in this country, have obtained a well-earned eminence, and which have also been sedulously investigated by foreign men of science, may perhaps, among their various and wonderful agencies and phenomena, including chemical action, and gravitation, throw a new light, at no distant period, upon *pathology*. To limit the agency of the physical forces, to *inert* matter, is inconsistent; and notwithstanding their modification by, and subjection to, the principle of vitality, until we have satisfactorily traced their relations with diseased actions, we shall not have penetrated this *arcanum*.

Vitality, is a force *sui generis*, and superior to all other *forces*, but, nevertheless, the *physical forces* exert over, and with vitality, reciprocal, and mutual changes and influences, and especially when disease is present, their relations become more nearly approximated.

Notwithstanding the pre-eminent, and exalted functions of mind force, and of nerve force, their sphere of action is small, and they fulfil a very limited office, in comparison with the *physical forces*, which extend over organic matter, and govern with despotic sway, earth, air, and water, and are nascent of disease upon the earth's surface, as also important elements of success in its treatment. The physical forces consist of (the different kinds of) electricity, magnetism, heat, motion, light, and chemical action, and exert a constant "static" force over matter, manifested in the various phenomena of so-called *electrolysis*, *induction of electric currents*, and *catalysis*.

Animal and vegetable products, as also mineral, are so prolific and abundant, that the earth's surface beams with vitality, and admiration is felt at the constant changes which they undergo, and to which they conduce. Vitality is renovated by the decay and death to which it is subject, and which may be considered the source of the juvenility

and regeneration of nature. These changes, productive of life and organization, and of death and disorganization, are the *media* in which this "static force" becomes manifested upon the surface of the earth, whose bosom, receives the *debris* of animal and vegetable life, and also of their resulting zymotical and electrical products, and which constitute upon it, a prevailing *miasm*.

Thus life becomes tainted, and vitiated by its near relatives, death and disorganization, (or by a low vitality, or vitality in a *depraved state, giving out infection*). The physical forces produce heat, moisture, electricity, magnetism, light, sound, and motion, and govern the terrestrial, solar, and planetary systems; and also the laws of gravitation, and the centrifugal and centripetal forces.

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The simplest elements produce important phenomena, both in nature and in art, and in the particular instance of the atmosphere, at any rate, the rule, *ne quid nimis*, is reversed, for we can scarcely have too much of a condensed, and pure atmosphere. Hecker says, "For nothing is more constant than the composition of the air, and in no respect has nature been more careful in the *preservation of organic life.*"[1] Dr. Dalton, speaking of the atmosphere, describes

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Notwithstanding the imperceptible and gradual changes to which the weight of the atmosphere is liable, yet this agency must exercise considerable influence upon vitality, and it is questionable if any chemical, or therapeutical agent whatever, has the same silent yet direct influence, or exercises so equable and persistent an agency over organization, as atmospherical pressure, either in health or disease, since its weight may, in a few hours, be increased or diminished to the extent of more than 10·00 lbs.

CHEMICAL ACTION.

The influence of chemical action, or of electrical action (which are probably the same things) constantly taking place in and upon organic matter, induces on the surface of the earth, that condition which is familiarly called *miasm*, and which, under certain other conditions, arrives at a more intense and active state which state, we will call *hypermiasm* (epidemy and contagion); the agency of both magnetism and electricity, is present in the manifestation of this chemical, or electrical action, which causes the "induction of electric currents," and is probably a "static" balanced force, which always, and everywhere produces that universal action, or principle called electrolysis and *catalysis*.

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Electricity, motion, caloric, and moisture, are congenial, and correlative, and light, is common to both electricity and magnetism, electricity being active and magnetism passive. Electricity, we find to be produced most abundantly at the equator, and within the tropics, where the solar rays come in direct contact with the earth's surface, but from various causes it becomes dispersed and diffused, and is found to pervade universally the earth and the atmosphere.

Magnetism also, takes its source, and is probably produced at the equator, and observes polarity dispersing itself in currents, north and south, travelling with great velocity in those directions; whereas electricity, is dispersed east and west, or travels in the earth's course of revolution.

Thus electricity, motion, caloric, and moisture, are congenial; while magnetism, motion, caloric, and moisture, are uncongenial; and caloric is always an accompanying phenomenon of electricity; and light, motion and moisture, are the most manifest phenomena of both electricity and of chemical action.

The causes of the dispersion, and diffusion of electricity and magnetism, produced as above stated, constantly at

the equator and within the tropics, are *three*—1st. Caloric, which is generated by the direct influence of the solar ray upon the earth's surface, expands the elastic air to the extent of a 480th part for every degree of temperature. Thus, supposing the mean temperature of the place to be 32°, and it should become increased to 152°, in that case the surrounding atmosphere, within the influence of this degree of heat would, by its elasticity, become expanded one third, or occupy one third part more space; and by its segregative and expansive properties, caloric acts upon the molecular particles of matter, and of elementary bodies, and thus facilitates the escape, and dispersion of magnetism and electricity.

Caloric thus generated, produces this expansion of the atmosphere, and the atmosphere carries off the electric fluid with it to a high elevation, where the currents of air moving north-east, on the north side of the equator, and south-east on the south side, disperse it by the cold, and dense air, which rushes in to replace them beneath: thus the segregative and expansive action of caloric, upon the molecular particles of matter, render nascent the magnetic principle, and magnetism forthwith obeys polarity, and proceeds north and south.

The currents of air, as above described, running on the north side of the equator north-easterly, and south-easterly on the south side of the equator, are the second causes of the dispersion and diffusion of electricity, and magnetism.

Magnetism, is also a principle pervading the earth, its surface, and the atmosphere, and has an attraction to the poles, and has also a strong attraction for electricity, which is reciprocal; and it has an equally strong repulsion of caloric, and moisture.

Electricity, becomes consequently carried off, (by this attraction of magnetism, at right angles to the north and south), from its normal course, easterly and westerly; and this constitutes the third cause of the dispersion and diffusion of electricity and magnetism. Thus caloric and magnetism have a normal association with electricity, and the first, by its expansive influence upon the elastic air, assists to diffuse and disperse electricity.

Magnetism, attracts electricity from its easterly and westerly solar course, into its own native currents north and south, which being at right angles from the course of electricity, gives the latter an oblique direction over the surface of the earth: and these three causes, act within tropical and equatorial influences, to diffuse equally electricity and magnetism.

The normal condition of electricity, and magnctism, differs in this, whereas magnetism, from its polar attraction, prevails most in high latitudes, and electricity least; on the other hand, electricity prevails most abundantly, the nearer we approach the equator, and magnetism prevails the least in those latitudes, from its polar attraction, and from the antagonism of magnetism to the caloric prevailing in those latitudes.

Electricity, and caloric are present at, and are necessary to the development of the chemical action to which we refer; the phenomena accompanying it being motion, heat, light, and moisture, and chemical action prevails the more within the tropics, from the greater influence of the solar ray in generating caloric.

Chemical action which produces *hypermiasm*, prevails, and has most influence at the equator, and within the tropics, thus electricity and caloric may be considered to be the

conditions which produce miasm, and which form the circle necessary for the evolution, and completion of, and may be said to constitute the last link which terminates in hyper-miasm, and which has the greatest prevalence in the lowest latitudes, *cæteris paribus,* whereas magnetism exists in a greater intensity the higher the latitude, and its force is at the maximum at the poles, and within the polar circles.

Sir Humphrey Davy, speaking of "electrical attractions," says—"Finding that acid and alkaline substances, even when existing in the most solid combinations, or in the smallest proportion in the largest bodies, *were elicited* by *voltaic electricity,* I established that they were the results of *decomposition,* and not of composition or generation; and referring to my experiments of 1800-1-2, and to a number of new facts, which showed that inflammable subjects, and oxygen, alkalies, and acids, and oxydable and noble metals, were in electrical relations of positive and negative, I drew the conclusion *that the combinations and decompositions by electricity were referable to the laws of electrical attractions and repulsions,* and advanced the hypothesis, '*that chemical and electrical attraction were produced by the same cause, acting in one case on* PARTICLES, *in the other, on* MASSES;' and that the same property, under different modifications, was the cause of all the phenomena exhibited by different voltaic combinations."[1]

In the following paragraph Mr. Grove says—"Sir Humphrey Davy claims this as a discovery, of which merit he was attempted to be anticipated by some electro-chemists of Germany, Sweden, and France; speaking of Italy and England *having a prior preference,* he says, amongst other

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the average which the age would indicate, and gives, under such circumstances, a character of *senility* to the human constitution. Thus, where robust diseases are never manifested, robust remedies should be cautiously administered; notwithstanding the vital powers, in young and middle-aged subjects, even under such circumstances, rally with wonderful elasticity and buoyancy, when disease is relieved by remedies, and some conditions of disease, can only be subdued by a decisive practice.

A better arrangement of the knowledge obtained of the action of medicines, and a more painstaking, and strict enforcement of a correct manipulation is wanted. And we should bear in mind that the therapeutical art consists very much, first, to endeavour to find out a remedy, and next, to determine with how small a portion, or quantity of it we can accomplish our purpose, or cure disease; not to revel in the possession of our resources, or amongst the temptations of many *agents*, but endeavour to determine and limit the circle of remedies, to the *minimum* in *number*, as also to the *minimum* in *quantity*; and a well considered periodicity, in the administration of remedies is of high importance.

Dr. Billing's hypothesis, of the *tonic* action of the metallic salts upon the extreme vessels, in inflammation, and fever, and also especially of the tonic action of arsenic and mercury, which gives to them a specific virtue in febrile and some adynamical conditions; and, again, the peculiar sedative agency, of large doses of calomel in *congestive fever*, which the author has witnessed with great satisfaction during many years' experience of its singular efficacy;—and the agency of the iodides of potassium, have not been sufficiently investigated, or placed in their proper therapeutical

relations, but their value as remedial agents is indisputable. And these remedies, especially require the most observant, and cautious attention to manipulation, combination, and exactitude in the division of the quantities administered, and upon which their virtue and safety depend.

There are no medicines which act so directly, and uniformly upon the absorbent system, and lymphatic vessels, as do the chloride, and bichloride of mercury, and their agency is now become easily measured; and as an alterative on the one hand, and a sedative as well as an alterative on the other, the chloride is an invaluable remedy. The chloride in a full dose, either alone or combined with an equal quantity of Pulv. Jalap., to the extent for an adult of eight grains of each, if its agency be allowed to remain undisturbed, and quietly in the system for twenty-four hours, is decisive and satisfactory; after which it may be carried off, by administering the sulphate of magnesia, or other neutral salts; or rhubarb and magnesia, for that purpose.

The secretions become, by this appeal to the absorbent and lymphatic system, copiously and insensibly determined, and carried into the intestinal series in large quantities, charged with morbific matters, and the relief resulting to vitality from which, produces a curative and sedative influence. One dose, in the above proportions, administered in *Asiatic cholera,* never fails to restore the vegetative and ganglionic functions, so singularly collapsed and prostrated, which they are always found to be in those cases; and functional secretions from the skin, liver, and kidneys, which before were entirely suppressed, presently take place; the same occurs in congestive *typhus,* and in which cases large doses of calomel induce a state of profound sleep, which may have been previously entirely absent; and in place of which a state of unconsciousness may have previously existed, with the eye-

lids partially opened, and accompanied with bed-picking, and either burning heat upon the dried skin, or a goose-flesh skin, with complete *rigor*, or *collapse*.

Its agency, in the same dose, is equally efficacious in every kind of visceral inflammation and obstruction; and it is also peculiarly useful in most cases of *dysmenorrhœa*: which leads to the conclusion that by determining the morbific secretions, into the intestinal series the relief is thus obtained.[1]

To familiarly elucidate and explain disease, we might for that purpose assume an imaginary *graduated scale*, making health the middle point from which the scale should ascend *above* health, till it arrived at the *figure* which should denote *death*; and again, to descend at the opposite extremity of the scale *below* health, till it arrived at the figure, which may again represent *death*. This imaginary *biotometer*, is suggested as a crude and fanciful measure, serving to show the intermediate degrees, which might be thus indicated, on the ascending and descending scales, of increased, or diminished degrees of vitality, to arrive at the central point of health, progressing, at each extremity of the scale to *death*, from different conditions of vitality, and thus helping to denote the intermediate derangements, and diseases, either from excess, or deficiency of vital action.

PHYSICAL FORCES.

The *physical forces*, or the so-called *imponderable bodies*, in the investigation of which, Sir Michael Faraday and Mr.

[1] The author during a long practice, has always found *tartarized antimony*, the *chloride* and *bichlorides of mercury*, either alone, or in combination with *foxglove* (the tincture preferred in doses of fifteen drops) capable of subduing inflammation without resorting to the *lancet*, and only occasionally even to topical blood-letting; *and even the necessity of using these remedies, may become anticipated, or superseded, by the adoption of the preceding practice.*

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remarks—'And considering myself as much the author of it as I was of the decomposition of the alkalies, &c.'"

Mr. Grove says again—"By chemical affinity we can directly produce *electricity*; this latter force was, indeed, said by Davy to be chemical affinity acting on masses: it appears rather to be chemical affinity acting in a *definite direction*, through a chain of particles: but by no definition can the exact relation of chemical affinity and electricity be expressed, as the latter, however closely related to the former, yet exists where the former does not, as in a metallic wire, which, when electrified or conducting electricity, is, nevertheless, not chemically altered; or, at least, *not known* to be chemically altered."[1]

Mr. Grove says again—"What is called voltaic electricity might equally, perhaps more appropriately, be called voltaic chemistry."

Magnetism is the power of electricity spoken of by Mr. Faraday, Grove, and others, as electricity of tension, or static electricity, while the other form spoken of by them is electricity of motion, or (called by Mr. Grove) *dynamical electricity*; the first being passive, and consequently resisting electrical action, motion, moisture, and heat; and the other producing always electrical action, heat, motion, light, and moisture, the consequence of having thrown off the first. Thus these philosophers, and others, acknowledge the existence of two electricities, or states of electricity, and yet can only speak of them as one and the same thing, or as producing each other—the one always generating the other simultaneously—thus making all electrical and all *magnetical* forces identical in character and quality.

[1] 'Corr. of Physical Force,' by Grove, Esq., p. 77.

"In the phenomena of the voltaic arc,[1] the electric spark, &c., to which I have already adverted, electricity produces *light* of the greatest known intensity. It directly produces *magnetism*, as shown by Oersted, who first distinctly proved the connection between electricity and magnetism. These two forces act upon each other, not in straight lines, as all other known forces do, but in a rectangular direction; that is, bodies affected with dynamic electricity, or the conduits of an electric current, tend to place magnets at right angles to them, and, conversely, magnets tend to place bodies conducting electricity, at right angles to them. Thus an electric current appears to have a magnetic action, in a direction cutting its own at right angles; or, supposing its section to be a circle, *tangential* to it. If, then, we reverse the position, and make the electric current form a series of tangents to an imaginary cylinder, this cylinder should be a magnet." . . . "Lastly, electricity produces *chemical affinity*, and by its agency we are enabled to obtain effects of analysis or oxanthesis with which ordinary chemistry does not furnish us. Of these effects we have examples in the brilliant discoveries by Davy of the alkaline metals, and in the peculiar crystalline compounds made known by Crosse and Becquerel." pp. 53 and 54.

"Light is perhaps that mode of force, the reciprocal relations of which with the others, has been the least traced out." p. 55.

To use the term of Mr. Grove, this "correlation," under such circumstances, becomes disturbed, and magnetism passes off in the form of *electricity of tension* at right angles, leaving electricity to pass forward to heat, motion, light,

[1] 'Corr. of Physical Force,' by — Grove, Esq., p. 53, 63.

chemical action, and affinity; also at right angles from the electric current, as *electricity of motion.*"

After careful consideration of the experiments of Mr. Faraday, and the eminent men who with him have devoted their inquiries to the investigation of the science of electro-magnetism, the conclusion arrived at is, that electricity and magnetism are identical, and that when, through their machine experiments, they explain magnetism, they at the same time elucidate and explain electricity; and when they demonstrate electricity, they demonstrate also magnetism; and that pure or simple magnetism, and pure and simple electricity, are the same: every experiment investigated tends to this conclusion.

The theory of induction, or the principle implied and asserted under that name, and adopted by scientific men in explanation of the phenomena and results, which, in the course of their inquiries, they have arrived at through the aid of electro-magnetical machinery, is also capable and sufficient to explain the various conditions, changes, and phenomena, which are present in the development of epidemy.

The discovery, on the one hand, of catalysis, and the "induction of electric currents," and again, by Faraday, of the principle of "definite electrolysis" have given a new character and a greater extent to our knowledge of the physical forces, and a fresh incentive to assist our inquiries into their agency and results.

In elucidation of this interesting subject, we will again refer to some quotations from Mr. Grove's 'Essay on the Correlation of the Physical Forces.' Mr. Grove says—"Light, heat, electricity, magnetism, motion, and chemical affinity, are all convertible *material affections;*

assuming either as the cause, one of the others will be the effect; thus heat may be said to produce electricity, electricity to produce heat, electricity magnetism, so of the rest. Cause and effect, therefore, in their abstract relation to these forces, are words solely of convenience, we are unacquainted with the ultimate generating power of each and all of them, and probably shall ever remain so: we can only ascertain the normæ of their action; we must humbly refer their causation to one omnipresent influence, and content ourselves with studying their effects, and developing by experiment their mutual relations." pp. 30-2.

And again, "the sense I have attached to the word correlation, in treating of physical phenomena, will I think, be evident from the previous part of this essay to be that of a reciprocal production; in other words, that any force capable of producing another, may, in its turn, be produced by it,—nay, more, can be itself resisted by the force it produces in proportion to the energy of such production, as action is ever accompanied and resisted by reaction; thus, the action of an electro-magnetic machine is reacted upon by the magneto-electricity developed by its action." p. 95.

Thus, the earth and the atmosphere, serve for examples of the influence of the physical forces, but their influence is equally manifested over the aqueous, which is so large and important a portion of creation.[1]

Water, or moisture, is indispensable in the production of chemical action, and water is a product of electricity; and which latter is opposed to the principle of magnetism, and magnetism becomes dispersed or separated by *electrolytical action;* and chemical action—which is a manifestation of this separation—cannot take place without the presence of

[1] Appendix K.

water, or moisture in some degree, which assist alike, in developing the germ of life, in producing decay and death, and in disintegrating dead matter, to make it available for the nutriment of living organization.

Magnetism is what Grove and Faraday describe to be static electricity, or electricity of tension (pure?); and the other, electricity of motion, or *dynamical* electricity.

Moisture is incompatible with the induction of static (or pure) electricity. Faraday, Antinori, and Nobili, in their experiments on the electro-motive power of magnetism, say—"The new currents of Faraday pass, although with difficulty, through humid conductors. . . . In the case of other known currents, I have demonstrated elsewhere *that there is always chemical decomposition when they pass liquid conductors*, and that, however feeble they may be, the decomposition is always assured by their transit through the fluid."[2]

Moisture—Water—is both an electrode and an electrolyte, and contains, or is composed of, two elements, one negative, and the other positive—hydrogen and oxygen. "Many bodies are decomposed directly by the electric current, their elements being set free; these I purpose to call *electrolytes*. *Water therefore is an electrolyte.* The bodies which, like nitric or sulphuric acids, are decomposed in a secondary manner (752-757) are not included under this term. Thus for *electro-chemically decomposed*, I shall often use the term *electrolyzed*, derived in the same way, and im-

[1] Vide 'London and Edinburgh Philosophical Magazine and Annals, vol. ix. p. 409. Vide also 'Philosophical Transactions' for December 21st, pp. 140, *et seq.* to 192, which Mr. Faraday calls "My original Researches," 'Experimental Researches on Electricity,' by Mr. Faraday, pp. 90, 147, 154, *et seq.*

plying that the body spoken of is separated into its compounds, under the influence of electricity: it is analogous in its sense and sound to *analyse*, which is derived in a similar manner. The term *electrolytical* will be understood at once. Muriatic acid is electrolytical, boracic acid is not."[1]

MIASM.

Miasm, is generated by moisture. Certain molecules of matter, and elements of organization, as we have had occasion to notice in an earlier part of this inquiry, may remain for ages; and by the addition of water, or moisture in some degree, heat and air become evolved, and these elements forthwith start into life, growth, and development; or, again, by the access of air, warmth, and moisture, after perhaps *a thousand years*, they may forthwith decay and perish. This applies to zymotic (the lowest in the scale of vital) products, and also to the higher conditions of vitality and organization.

Miasm, is a low, zymotic, vegetative organization, *sui generis*, raised to *hypermiasm*, when it finds a suitable and causative *nidus*, or a *diathesis*, of a local and social nature. The same effect results, when gaseous materials, of an hydrogenous, carbonaceous, sulphurous, phosphorous, and nitrogenous character predominate, and produce chemical action which also alters both the density and salubricity of the atmosphere, as well as its chemical and electrical conditions.

[1] Dr. Faraday's 'Experimental Researches on Electricity,' Lond. and Edinb., Phil. Mag. Journ. of Science, p. 163.

HYPERMIASM.

It is probable that miasm comes through electrical and chemical action, and during which, heat being evolved, magnetism becomes dispersed, and thus *hypermiasm* obtains a local, social, or personal diathesis (*synonym*, epidemy and contagion). In high latitudes, where no personal or social *diathesis* rules in which magnetism more prevails and electricity less, neither *miasm*, nor *hypermiasm*, are supposed to obtain ascendancy beyond a certain degree of latitude.

The triumphs of chemical action commence after vitality ceases, and do not prevail, while the nervous and vascular systems retain their integrity, although their assaults are *malign*. We thus infer that miasm, and chemical action, are generally the same thing, under certain *diatheses*, or conditions, and are the *proximus a postremo*, to *hypermiasm*.

Since disease and health occupy the same material space, health necessarily is the interpreter of disease, and we have very few records of the material and physical conditions prevailing during *epidemy*, although all with singular unanimity concede the presence of some active agent in the *atmosphere*, and the physical conditions of the atmosphere during the commencement of the epidemic cholera in 1832, made by Dr. Prout, and already quoted, is all that we have to refer to upon that subject. Thus, whether the phenomena of inflammation, prevails most when atmospheric pressure is lowest, or its rarefaction greatest—as we might *à priori* infer would be the case—and when the tonicity of the fibrous structures (nervous and vascular), and of the heart, arteries, and circulating vessels, would consequently be diminished or lowered, has yet to be ascertained.

Dr. Billing[1] in explaining the phenomena of inflammation, has adopted a different hypothesis to guide him, and appeals to mechanical, electrical (or, as he terms it, galvanoid or dynamical) conditions, and nervous agencies as equally, and consentaneously influencing the phenomena of inflammation. The more simple our interpretations of the laws of nature, the more agreeable and congenial are they to nature herself, who must regard with pity, our complex notions of her works, ordained for her simple and familiar elaborations, and for which her general laws, in their several spheres, prove always sufficient; and from disregarding or overlooking which, we are liable to mistake phenomenal, for causative actions or manifestations: and *diathesis*, or specific conditions, are always the handmaid through whom the behests of nature are conveyed in all her manifestations.

We are not prepared to accede to the view entertained by Dr. Billing, that physical laws and vital laws are similar, consentaneous, and identical; the necessity of the nervous principle always accompanying the manifestation of vital physics, sets the question at rest, since no mechanical laws will apply to, or explain nervous action, although physical laws which are superadded, aid and assist in the manifestations of organic and vital functions.

Dr. Billing says, quoting from Bichât—"Bichât. . . . . from thus refining too much upon the functions as connected with vitality, he overlooked the more simple explanations which physics afford, and says that 'it is ridiculous to attempt the explanation of the phenomena of changes in

[1] 'Principles of Medicine,' by Archibald Billing, M.D., M.A. London 4th edition, pp. 32, 33, &c.

animal functions by mechanical laws, and the variations in dimensions of vessels, &c.'; but I think I have shown, that what he calls vital laws, are but these mechanical laws modified by the Deity: we do not know the intimate structure or mechanism by which a muscle or capillary contracts; but doubtless it is as simple as a pair of lazy tongs, and as easily excited to action as they are by the hand, or the piston of a high pressure engine is by the steam."[1]

And again, speaking of "morbid poison," or contagion—"The process of fermentation affords an analogy. 'A little leaven leaveneth the whole lump': a most minute portion of smallpox virus, on the point of a needle, produces an inflammation similar to that from which it was taken. What is this inflammation but chemical decomposition? What else is fermentation? This virus may be absorbed and circulated, as has been hitherto supposed; or it may produce its effect by some chemical, and consequently electric or galvanic action, positive or negative, on the nervous tissue, constituting a morbid sensibility, which is propagated to the whole system: this is evinced by racking pains in the spinal cord, brain, &c., producing languor, convulsions, &c., with disturbance of all the functions. All this passes off, we know, in a definite time, as the dough ceases to rise when all the particles inflamed by the leaven have gone through their process of decomposition. So ends smallpox, measles scarlatina, typhus, plague, synocha petechialis, &c.; the leavens of which are either communicated by contact, or carried through the air to the lungs, &c."[2]

Dr. Billing, as the author reads him, esteems the function of the heart as similar to the action of an hydraulic *fountain*

[1] Billing, p. 18.
[2] Ibid., pp. 58, 59.

and the arteries, veins, and other circulating vessels, as so many elastic tubes governed by the usual laws of hydrostatics.[1]

The chemical theory, to which Professor Liebig, as a chemist, would necessarily give a preference, excludes the influence of the cerebro-spinal and ganglionic systems, but the physiologist cannot exclude the agency of the nervous system.

Notwithstanding the immense labour, and the great value of the inquiries of Sir Michael Faraday, which have extended, and been continued during so many years, *electrostatics*, still remain to be more definitely explained. The instrument invented by Mr. Faraday, and described by him, and called *volta-electrometer*, in the 2d Section of his 'Experimental Researches on Electricity,' and of which we have given a quotation in Appendix K, from the 'London and Edinburgh Philosophical Journal of Science,' v. iv, p. 293, serves sufficiently to establish the science of *electrostatics*, although manifested in that isolated form.

If it be ultimately decided that magnetism, and gravitation are identical, or that *gravitation* is dependent upon the principle of *magnetism*, for its manifestation, (which would seem not altogether improbable,) the velocity of electricity may be more easily understood and explained, as being a manifestation, of what might be not improperly termed *electrostatics;* and electricity may be said to be constantly *gravitated*, by magnetic attraction *to the poles*, by the close affinity of electricity to magnetism; and electricity being so much lighter than the atmosphere, through which it passes; while, on the other hand, the *atmosphere*, gravitates to the earth, which serves to explain the greater velocity of electricity, to any other matter.

[1] Op. cit., p. 14.

The loss, or a diminution of the vital principle, calls into action chemical laws, and produces changes and affinities, *sui generis*, opposed to vitality, and which of themselves are the germs of diseased, or perhaps the *proximate* causes of diseased actions, and may be considered the harbingers of death. Chemical laws are kept in abeyance and subjection, when the vital principle is in its integrity, and chemical affinities become suspended, and are subservient, during the entire and energetic action of the vital principle; thus the laws of life and organization, are paramount, and superior to chemical laws, and the first inroad of chemical laws, upon vitality, and when organization has become depreciated to a certain *point*, their usurpation over the principles of life is complete.

These views may explain the phenomena of epidemy-contagion — inflammation, and also of the numerous adynamical conditions we find in cities, and amongst dense populations, where the social diatheses are defective, and bad; and each of which have the tendency to act reflexly upon the brain and the nervous centres, and to induce nervous irritability, and madness.

To elucidate the *Diatheses*, and the *Diathetics* we have spoken of, a few quotations upon the history of epidemy, as it has been manifested at different epochs of time, will serve for that purpose from Hecker's interesting book on 'The Epidemics of the Middle Ages.'

The remotest records of the history of epidemy, which prevailed long before the Christian era, are associated with two great names of antiquity, namely, the eloquent Thucydides, who, during his banishment from want of success as a General, wrote the history of the Peloponessian War, which lasted forty years; the other, the Divine

Hippocrates of Cos, who received, and deserved the name of *Great*, and whose opinions Galen esteemed (and so were they esteemed by the philosophers of his age) equal to the voice of an oracle.

When the plague ravaged the cities of Greece, Hippocrates predicted its visit to Athens, and his skill delivered the Athenians from the scourge; and he was publicly rewarded with civic honours and a golden crown. Hippocrates carefully, and openly declared the results of his practice, and made known the means he used in the cure of disease, and, which gave seventeen in forty-two, as the number cured under treatment. The miseries inflicted by this long war, generated pestilence, and pestilence in every age, has assumed much the same character and phenomena; war, and famine being its harbingers, whether called plague, the black death, sweating sickness, dancing mania, dysentery, yellow fever, typhus, or epidemic cholera; and their distinctive peculiarities are traceable very much to *diathesis*, or to that condition, upon which Hippocrates laid so much stress, namely, "situation."

With respect to the plague of the 14th century, most of our information has reached us through, and is derived from, the obscure medium of tradition, since no accurate statement, even of the number of the population of that time, existed; darkness and ignorance prevailed over populations, civilization was yet scarcely aroused, from the profound sleep of centuries: inhumanity, credulity, barbarism, and superstition had sway over the mind, and an iron political rule was universal, and, indeed, was the only safeguard of social life; and tyranny and despotism became esteemed a blessing in the midst of insecurity and illegality.

In this age, human life was esteemed of little value;

serfdom and villanage still continued to perpetuate rudeness, and without social interests, the powers of law, right, and justice were feeble, and could not take strong root in the political fabric, or in the public feeling.

We have only glanced at the horrors of this plague, which spared neither prince, priest, nor pauper; and was accompanied also by a fatal murrain among the cattle; but it may be better conceived by stating the numbers it destroyed, namely, "that Europe lost during the black death 25,000,000 of inhabitants and many thousand lives were barbarously sacrificed to the superstitious prejudices of the vulgar:"[1] from the time of Thucydides, a vulgar suspicion has been entertained that the springs or provisions have been poisoned, or the air infested by some supposed enemies of the commonwealth, "and these absurd prejudices still hold influence over the unenlightened in the present day."

After the plague in the 14th century (1349 to 1360) "the annals of contemporaries report, that throughout the land (England) only one tenth of the inhabitants remained alive," and "the Schwarze Tod," or "Black Death," in many particulars resembling the epidemic cholera, of recent date, prevailed in the 14th century, and destroyed a large portion of the human race. It was "an universal pestilence which extended from China, to Iceland and Greenland, and was diffused over Asia, Africa, and Europe, and was one of the greatest natural calamities that ever affected the human race; as also were the 'Dancing Mania' and 'Sweating Sickness.' And further, we learn that in the fourteenth century, one quarter at least of the population of the old world, was swept away in the short space of four years; and that some countries, England amongst the rest, lost

[1] Hecker, p. 30.

more than double that proportion of their inhabitants in the course of a few months."

In 1347, "Disease, the invariable consequence of famine, broke out in the country, as well as in cities; children died of hunger in their mothers' arms—want, misery, and despair were general throughout Christendom."

In making every allowance for the superstition of the middle ages, we must not be regardless of the indisputable physical phenomena which preceded, and accompanied the pestilences which then prevailed. The year previously to the visitation of the plague upon the Island of Cyprus, which arrived from the east in 1348, the sea rose, and overflowed the island, dashing ships on its coast, and making many wrecks; the inhabitants having massacred their Mahometan slaves, fearful of their rising against them, fled "in dismay" or were swept from the land, victims of flood and pestilence, and few outlived the terrific event; and this beautiful region became involved in universal desolation.[1]

"In the middle ages also, extraordinary convulsions of nature were manifested, in supernatural meteoric, and telluric phenomena. Such commotions commenced in Europe in 1348, and in Asia and China a year or two before; which preceded the visitation of pestilence about a year, namely, earthquakes, droughts, volcanic eruptions, floods, not attributable to rain alone, pestiferous winds whose odours suffocated the inhabitants, and famines in constant succession are amongst the traditions of that age. In the inmost depths of the globe, that impulse was given in the year 1333, which, in uninterrupted succession for six and twenty

[1] Op. cit., p. 13.

years, shook the surface of the earth even to the shores of Europe. From the very beginning the air partook of the terrestrial concussion, atmospherical waters overflowed the land, or its plants, and animals perished under the scorching heat. The insect tribe was wonderfully called into life, and as if animated beings were destined to complete the destruction, which astral, and telluric powers had begun. Thus did this dreadful work of nature advance from year to year, ... which excited a powerful influence, both above and beneath the surface of the earth, and . . . . convulsed the whole earth."[1]

"An unexampled earthquake" visited the South of Italy in January, 1348, . . . "the duration of which is stated by some to have been a week, and by others a fortnight, and which recurred until the year 1360."[1]

"Putrefied locusts," and "countless human corpses, which could not be removed quickly, may account for the pestiferous mists and vapours. Such are the recorded events which took place before the eruption of the black plague in Europe, and, "if we had no other information from which the excitement of conflicting powers of nature during these commotions might be referred, yet scientific observations in modern times have shown that the relation of the atmosphere to the earth is changed by volcanic influences."[2]

In the present day plague has become nearly extinct in Europe, the "black death" and "sweating sickness" are only known as medical myths. Smallpox is of limited prevalence, and greatly diminished in mortality, and typhus is no longer epidemical, and only to be found in the abodes of misery and poverty. Among the habitations of the

[1] Hecker, p. 18. [2] Ibid.

wealthy, where healthy diatheses are maintained, it only and very seldom exists in a sporadic form, and the improved social conditions of the present day, tend to disarm the violence of contagion and epidemy, and their extinction may not be despaired of.

Plague formerly ravaged and depopulated countries; smallpox prevailed as a general and universal pestilence, and typhus, at a more modern date, has assailed every class in society. Some epidemies have become extinct, or have shown a migratory tendency, and travelled elsewhere, and new ones have been generated; and the changes produced by civilization, upon the habits of the people, have produced this result. If a patient infected with plague was to be introduced into this island in the present day, from Egypt or Constantinople, he would not propagate the disease here.

The origin of the *Plague* is lost in obscurity, and we can trace it to a period before the Christian Era. "We are also able to trace many references to former pestilences.[1] This disease was a consequence of violent commotions in the earth's organism—if any disease of cosmical origin can be so considered. One spring set a thousand in motion, for the annihilation of living beings."[2]

Smallpox has observed a more steady and undeviating character than other epidemics, and would seem to usurp a privileged mortality, traced to the remotest periods of time, which may be attributed to the malignant nature of its contagion. Typhus fever is a disease of general prevalence in the present day in temperate regions; the earliest accounts we have of it in this country date from what was called the "Black Assize" at Oxford, and it broke out at the Old Bailey in

[1] The 14th century was visited by five or six pestilences.

[2] Op. cit., p. 19.

1756, "when the Lord Mayor, two of the Judges, and several other eminent persons, died, infected, as was supposed, by the prisoners." In these days, social comforts, and codes of decency and cleanliness, were little appreciated, and places of resort, especially markets, courts of justice, churches, and theatres, with their precincts and cloisters, were witnesses of unspeakable pollutions; and the sources from which pestilence became disseminated. The morals of the age were at the lowest, and in no country worse than in England.

Typhus ranges within the latitudes of 40° and 60° north, and is rarely found in low latitudes, or between the tropics. The career of Asiatic cholera has observed a similar social progress; but not accompanied with similar phenomena. It is also affirmed, that although cholera steadily follows the typhus and typhoid track, they never exist together, or at the same period, epidemically; but cholera, as the author believes, is a new form or manifestation of typhus disease, which will explain this.

The late Dr. Baillie, in his extensive practice, scarcely met with a case of typhus, amongst the fashionable haunts of this metropolis, at a time when it was committing ravages amongst the destitute poor, located at its opposite extremity, and amongst whom it prevails endemically, in cycles of two or three years, and it generally commenced at the onset of autumn, and continued till the succeeding spring, in low districts, where atmospherical diffusion is at the minimum, and dampness and dirt predominate.

Typhus constantly follows commercial depression, with scarcity and bad food; and scarcity and famine, were so frequent and regular, that in the time of our ancestors, they

occurred in cycles of five or six years, and scarcity observed so strict a fellowship with pestilence, that "pestilence and famine" became household words.

Thus pestilence and epidemics, have in all ages, been accompanied with famine; and every bad or short harvest has, in modern times, brought in its train, typhus, in these islands. This was particularly experienced in the war years, in 1799, 1800-1-13-14, and at the end of 1815, and the whole of 1816-17; those seasons were not only inclement, but universally wet, particularly during the summer and autumn of the two last-named years, 1816-17, till at length the beautiful year of 1818 came to the rescue, the mean temperature in those years being four degrees lower than the usual average, consequently fruits and grain did not arrive at maturity, but generally remained unripened, and the latter became subject to zymotic infection almost universally. Other concomitant evils attended—a defective potato-crop—mildewed straw for the bedding of the poor—bad ventilation, from the necessity of shutting out cold and inclemency, aggravated in Ireland by want of fuel to drive away damp, and with which to cook food, and dry clothing, peat being principally used for that purpose, could not be raised and housed during those wet seasons.

Defective nutriment makes all animals listless and indolent, and neglectful of cleanliness and exercise—hence the absorbent, lymphatic, and exhalent vessels become torpid, and mange, and farcy occur to animals, and adynamic disease to man, rendering him incapable to resist cold—the influence of the physical forces—and miasm.

In times of war, typhus always exists, and continues for some period after its termination, and where large masses are congregated, the mischief is more durable, and typhus destroys

more people than are slain by the sword; after the march of the French army to Moscow, during the Russian campaign, every kingdom in Europe was visited with fever for four years, and its ravages spread far and wide. Out of a division of the French army in that campaign, in 1813, of 25,000 men, 13,448 died of typhus, in four months, and out of 60,000, 25,000 died. The following interesting summary of the statistics of disease and mortality of the French army, during the late campaign in the Crimea, we quote from a distinguished periodical:[1]

"Dr. Scrive, who acted as physician-general to the French army during the last war with Russia, has just published a book which contains a painful account of the losses and sufferings endured by the French troops landed in the East, but particularly by those engaged in the siege of Sebastopol. Of 309,278 officers and men sent from France during that short war 200,000 entered the hospitals, and were treated professionally, 56,000 for wounds received in action, and 150,000 for diseases of various kinds contracted during the campaign. The first troops which embarked in France were attacked with cholera which followed them to Athens, Galipoli, Varna, and the Dobrudstcha. That scourge appeared to suspend its attack for a brief period, while the French in conjunction with their British allies gained the victory at the Alma.

On their arrival before Sebastopol, the cholera again attacked them, and the receptions in the military hospitals during the month of January, 1855, amounted to 9000. They were chiefly treated for cholera, scurvy, frostbites, and wounds of every description.

Typhus fever shortly after set in, but was quickly checked

[1] 'The Times,' November, 1857.

by the energetic treatment adopted by the French physicians. The health of the army was better during the spring of 1855, but the cholera reappeared in July and placed 4500 men *hors decombat*. Typhus fever set in again and added to the mortality.

On the 8th of September, Sebastopol was taken by the allied armies, but, nevertheless, between the 1st of September, 1855, and 1st of April, 1856, of 145,120 French troops under arms in the Crimea 48,000 entered hospitals. Dr. Scrive says, that the scurvy prevailed at this period, the constitution of the men being impaired through fatigue and privations. The doctor further adds that the most disastrous period of the campaign, in a medical point of view, was during the months of February and March, 1856. A violent typhus, engendered by the heaps of refuse in the camp, struck down more than 19,000 soldiers at the end of the campaign, notwithstanding the precautions adopted by the medical staff. It is said that the number of sick in hospital in proportion to the force under arms was never so great in any former campaign. Of the medical staff, 83 physicians or surgeons fell victims to their devotedness—'an enormous figure,' observes the author, 'when one reflects on the small number employed.' The French fleet likewise suffered serious losses from sickness."

"The first outbreak was that of cholera, which appeared in the French army at Gallipoli, at Varna, in the Dobrudscha, and at Athens,—causing, especially in the Dobrudscha, very considerable mortality."

Now, as cholera was epidemic in the year 1854, and as it raged with as much violence in the departments of France itself, as in the provinces of European Turkey, we may perhaps separate this item from the general account, as not attributable in the main to any incidents of the expedition.

This scourge, however, after ceasing for a time, reappeared in the camp before Sebastopol at the brginning of 1855, and thenceforward seemed to play its part less like a special plague than an ordinary malady induced by suffering and privation.

With cholera came scurvy — a sure expression of physical distress, and frostbites — that dreadful affliction which, under the name of 'Gelatio,' figured so prominently in our own medical reports. As a natural sequel and attendant of these calamities, typhus fever then set in, but at this period the resources of the medical staff had not been overtaxed, and the disease was fairly beaten out of the field by the skill and energy of the French surgeons.

All this while our soldiers had been suffering so fearfully that nothing but the invincible sentiment of duty could have kept them up to their work, and it still stands recorded as one of the many distinctions earned by particular individuals that they 'never missed a turn in the trenches.' At length the tide began to set the other way. The reports of our own correspondents, confirmed by the statements of others visiting the spot, roused the patriotism as well as the indignation of the country to its highest pitch; private generosity came in aid of government supplies, and before the middle of the year 1855, our army had seen its worst days. By the commencement of the year following it had assumed a totally new aspect, and when the conclusion of peace occasioned its return to England, it reappeared on these shores, not like the unfortunate victims from Walcheren, but in the very highest state of health, efficiency, and discipline.

With our allies, on the contrary, the worst of the suffering set in after the hard work of the war had

been finished. Sebastopol was taken in September, 1855, but the success brought no improvement to the condition of the French army; scurvy decimated its ranks, and when, six months after the victory, typhus again broke out, the medical staff could no longer subdue it, as before. More than 19,000 men are stated, in the report we quote, to have been struck down by this unsparing malady.

It is certainly interesting to observe the respective advantages and disadvantages attaching to the English and French systems of military administration—to remark how, at the outset, our allies enjoyed a superiority of condition, from their maintenance of a large military force on a regular war footing, and, as must needs be acknowledged, from the better organization of their army,—while, as things went on, our inexhaustible command of money and resources, coupled with our national faculty, of struggling upwards under difficulties, at length turned the tables in our favour.

But this is not the moral which, on the present occasion, we desire to recommend. We wish rather to point out, from the combined examples of the two armies, how very large a proportion, of what are regarded as war casualties, arise from circumstances independent of war. In the case of our own army the cannon of Sebastopol worked the least part of the mischief; in fact, through a considerable period, it signified scarcely anything to the condition of the troops, that the Russians were in front of them. They suffered not from bayonets or bullets, but from overwork, excessive exposure without sufficient protection, and want of proper food, clothing, and comforts. Under the same privations, the same mortality might be created any winter on the ridges of Aldershott. In the case of the French—though we are not, of course, quite so conversant with the internal

economy of their army—we learn enough from Dr. Scrive's report, to show us that preventible causes, are chargeable with the chief proportion of the evils recorded; indeed, it is plainly stated that the worst visitation of all—that of typhus fever, towards the close of the expedition—was engendered by the infection arising from the refuse of the camp."

In France, the average mortality of typhus, is in the proportion, of one in three, or four attacks; and in this country the proportion, is one in every six or seven attacked, showing, the superior social diathesis of this country. Epidemic cholera, has, with very few exceptions, been traceable through, and over palludal districts; and it would seem, that only one epidemic prevails at one time, an elucidation of which is given, in 'Statistics of Mortality in America,' of May 17th, 1849, showing that epidemic yellow fever prevented the access or prevalence of the *exanthemata* and *vice versâ*.

The forms which disease assumes upon the European constitution, differ from those affecting the natives of Africa or Asia, climates in which he may be temporarily resident; and little attention has hitherto been given, to the special diseases of the natives, which perhaps would explain, many interesting pathological and physiological phenomena and peculiarities,—thus, the *harmattan*, the "fearful" harmattan, so designated by the inhabitants of the countries in which it prevails, and which desolates their abode with pestilence and death, brings salubrity to the European, and drives away by its drying winds and heats, (coming from the east, over the burning deserts of Africa,) the epidemical, remittent, and sporadic fevers with which he is assailed, in these to him obnoxious climates.

This is explained, by the different physiological conditions of the constitutions of the two races, the one being easily affected by the miasmatic taints of these palludal tracts, while the indigenous race, is inaccessible to the painful influence, and the African is comparatively free from epidemics, the climate being to his orgnization and personal diathesis normal, and to the European destructive.

"During the dry season, the sea and land breezes are regular, and on this part of the coast (south-west coast of Africa), the HARMATTAN, or dry east wind is of frequent occurrence in this season. Its beneficial influence in promoting recovery from all diseases (amongst Europeans) experienced in this country is always remarkable; nor are its effects confined to promoting recovery, or invigorating the debilitated; epidemics are arrested in the midst of their progress, and even the virus of smallpox will not begin to act upon the system during its continuance, and if already commenced, the progress will always be favorable."[1]

The HARMATTAN is also thus described: "— a singular wind that blows from the interior parts of Africa, to the Atlantic ocean, on that part of the coast which lies between Cape Verd (N. Lat. 15°), and Cape Lopez (S. Lat. 1°,) sometimes for a few hours, sometimes for several days, without regular periods."[2]

Dr. Copland, who visited the South-west coast of Africa, in the year 18—, says, "Africans are comparatively free from epidemics, they are sometimes visited with plagues· Diacunculus, or epidemics, and fevers which are more en-

[1] 'Quarterly Journal of Foreign Medicine,' v. 3d, 1821, by Dr. Copeland.

[2] Rees's 'Cyclopædia,' art. Harmattan, *vide* Lind. (M.D.), 'Philosophical Transactions,' v. lxxi, and v. liii, p. 63, and Boyle's 'Western Coast of Africa,' pp. 43, 312.

demical and sporadic, and excepting plague, smallpox, dysentery, and yellow fever, epidemics may be considered rare amongst the Africans, according to the knowledge we at present possess of their social condition;" except smallpox, which, on its visitation, sweeps away whole tribes of the population."

It would have been contrary to the practice of Stahl, himself a philosopher, who always investigated and advanced, to maintain the crude speculations of his day, and if he had lived longer, he would have been inspired with the genuine spirit of investigation of his successors, Hoffman, Boerhaave, Sydenham, Gaubius, and Haller, whose doctrines were characterised by suggestive and vigorous reasoning, and from whom is dated, the first attempts at system in pathological investigations; and these great men, supplanted the most ancient, and abiding humoral doctrine, which obtained favour from the time of Galen, by the perspicuity of their anatomical and pathological inquiries, and by the force of their reasonings.

The several hypotheses worthy of regard, are first, Cullen's *spasm* of the extreme vessels; lately succeeded by Billing's hypothesis of the *relaxation* of the extreme vessels; the one advocating *tonicity*, and the other *atonicity* of the capillaries, as the proximate causes of fever, and inflammation. Then the excitability of Brown, with his *sthenic* and *asthenic* doctrines.

Yet much as these schemes have improved practice, by extending the field of investigation, and our knowledge of physiology, and of the *Materia Medica*, yet they have failed to build up a durable system; and in this, as in other instances, *natural science*, in the absence of definite laws

to explain disease, evades our grasp, and is difficult to comprehend, "*Scientia medicinæ, id artium.*"[1]

Cullen, speaking of this uncertainty, says, "Whether the practice of physic, should admit of *reasoning*, or be entirely rested upon *experience*, has long been, and may still be, a matter of dispute. I shall not at present enter upon the discussion of this, because I can venture to assert, that at almost all times the practice has been, and still is, with every person, founded more or less upon certain principles *established by reasoning.*"[2] And again, "Although these remarks upon a system which may now be considered as exploded or neglected, may seem superfluous, I have been willing to give these strictures on the *Stahlian* system, that I might carry my remarks a little further, and take this opportunity of observing, that in whatever manner we may explain, what has been called the *operations of nature*, it appears to me that the general doctrine of *nature curing diseases*, the so much vaunted *Hippocratic* method of curing, has often had a very baneful influence on the practice of physic, as either leading physicians into, or continuing them in, a feeble practice, and, at the same time, superseding or discouraging all the attempts of art." Dr. Huxham has properly observed, that even in the hands of Sydenham it had this effect. Although it may sometimes avoid the mischiefs of bold and rash practitioners, yet it certainly produces that caution and timidity, which have ever opposed the introduction of new and efficacious remedies. . . . . "Trusting much to the constant attention and wisdom of nature, they have proposed the *art of curing by expectation*; have, therefore, for the most part, proposed only very inert and frivolous reme-

[1] Cicero in Orat.

[2] Cullen's 'First Lines,' Preface, p. 5. Ibid., p. 11.

dies; have zealously opposed the use of the most efficacious, such as opium, and the Peruvian bark;" thus passing an oblivion over all the wonderful arrangements, physical and mechanical, of the human economy; machinery so delicate, governed by forces and physics so transcendant, subtle, obscure, and admirable, as to require constant attention—the intentions and reparation suggested by reasoning and art: and Cullen wishing to avoid a condemnation of Stahl, as a philosophical inquirer, further says, "After all, I ought not to dismiss the consideration of the *Stahlian* system, without remarking, that as the followers of this system were very intent upon observing the method of nature, so they were very attentive in observing the phenomena of diseases, and have given in their writings many facts not to be found elsewhere."[1] And amongst these we may more especially name Boerhaave, and Sydenham, who were only partially influenced by these notions.

Little progress as medical science had made a *hundred years back*, we derive evidence in these quotations, of the existence amongst the most eminent physicians, that ever adorned and improved the practice of medicine, of a full reliance in the efficacy of medical practice and treatment.

If moral influence were alone resorted to in the treatment of madness, *nature* might, at some stage of the disease, step in, and effect a cure.

Functional, or other derangements, as also disease, always exist in madness; and, simply correcting the sources of disturbance, will often obtain favorable results, and in addition to this the administration of judicious diet, exercise, and recreation will be found perhaps all that is required to restore health, if resorted to at an early stage.

A successful practitioner in the treatment of insanity,

[1] Cullen's 'First Lines,' Preface, pp. 13, 14.

must be familiar with disease in general, and also successful in its treatment, more especially, as many of the ailments of the insane are of an indistinct kind, indicating a state of *innutrition*, either from defect of nervous power, or error of the functions of assimilation, and a knowledge of the treatment of which is acquired by experience; and these forms of disease, are frequently removed by remedial treatment, and a practice directed *to do little enough well*, and more especially to produce, a mild alterative influence upon the glandular, absorbent, and lymphatic systems.

Cullen, in speaking of dyspepsia and hypochondriasis, endeavours to establish a difference between them, he considers dyspepsia to be a symptomatic, and hypochondriasis an idiopathic, or primary disease; nevertheless he at the same time considers hypochondriasis to be dependent upon the existence of the former, and at any rate, as he expressly states, it does not depend upon any peculiar temperament, or particular state or condition of the mind; and he recommends the same treatment for both.

The nervous irritation causing madness, often proceeds from ailments of long continuance, frequently the consequence of a deficient quantity of the *liquor sanguinis*, and a languid function of the heart; and we should aim to restore this deficiency by administering nourishing diet, and by endeavouring to improve assimilation and digestion, which we find more successful than any other mode of treatment.

Insanity not being a primary disease, is influenced by idiosyncrasy, mental and constitutional. Thus, after acute diseases have been subdued by treatment, time, or diet, there may supervene a continued debility, or a delayed convalescence; or the patient may have been the victim of depraved habits, long practised; ultimately, epilepsy, struma, or other latent and hereditary taints, become developed, and make

advances, increasing in the ratio of the depreciation of the physical powers, aggravated especially by diminution of nervous energy.

The nervous centres, at length manifest subjection to these encroachments; and the duration of the antecedents, and the poverty and depravation induced of the nervous and vascular systems, measure the mischief: and neuralgia, restlessness, irritability, and other mimetic ailments become developed, which will be succeeded, in most cases, by delirium and acute mania.

To maintain the nervous centres, in a vigorous and healthful state, a proper supply of blood is required to be circulated through them; and it should be always remembered, as we have endeavoured to demonstrate, that the brain is a very greedy and exacting organ, and when the blood is either diminished in quantity, or in quality, and the heart and blood-systems do not support these organs, as after inflammation, or acute and exhausting disease; or puerperal, and hysterical disturbances, which are always associated with an adynamic state of the system, delusions and moral insanity will be the result.

The administration of camphor, in conjunction with henbane, hops, and Cayenne or Chillies pepper, frequently calms irritability, and nervous excitement, and produces a beneficial influence, in conjunction with good sound old ale, when no other sedatives will afford relief, and when there exists, as there generally does, more or less, a condition of lacteal inanition; supported as these should be, by a nutritious and simple diet.

High or exalted mania frequently presents itself to medical treatment under three accidental and untoward conditions, namely—constipation of the bowels, frequently of some days' continuance; a state of entire exhaustion from

want of food, amounting to famine; and severe bruises all over the body; and sometimes sores or burns which have progressed to gangrene. The resistance of food is the most urgent, and proceeds in many instances from a state of spasm, or loss of function from inaction of the muscles of deglutition, and may be overcome by a perseverance, in exciting the fauces and pharynx with warm milk, passed over the tongue by a spoon to the back of the mouth, and the spasm, or the resistance, from whatever cause it may proceed, once overcome, the difficulty generally ceases more certainly by this means, than by the use of the stomach-pump.

Among the remedies, in the treatment of the more confirmed and chronic cases of madness, exercise in a pure, salubrious atmosphere stands highest. Serous effusion in the *theca vertebralis*, is not an unlikely cause of many nervous disturbances; and the use of counter-irritation[1] (as has before been advanced), throughout the whole length of the spinal column, particularly by applying a strip of leather covered with the Emp. Lytar.: keeping up a discharge afterwards from the skin-surface, and giving at the same time, internally, the carbonate, or other salts of iron, will be found very efficacious, as will also opening a seton in the back of the neck and accompanied with alterative doses of calomel, blue pill, and ipecacuanha.

Steel, in all its combinations, is frequently found to be a useful auxiliary, in restoring the vascular tone, and in invigorating the heart, and muscular or fibrous system in one series, as the mercurial salts have a tonic and invi-

[1] The early success of this treatment, communicated in the case of Richard Weston, a miller, and in the 'Lancet' of October, 1851, forcibly illustrates its value.—(The Author.)

gorating agency over the lymphatic and absorbent vessels in another series.

Hyoscyamus, camphor, Cayenne pepper, cobweb of the black spider, and tartar emetic, are each of them valuable and useful. In epileptic mania, where the powers are vigorous, the patient healthful, and the voice strong, manifested by noisy paroxysms of excitement, minute doses of tartar emetic, in the form of Liquor Ant. Tart., when administered, will quiet and subdue; and a similar effect will also be produced in maniacal frenzy, under particular circumstances, when administered in combination with a strong solution of camphor in water. It should, however, be used with considerable caution, and be but seldom resorted to.

The malt infusions, ale or stout, when of a sound and mature condition and quality, are excellent in combination with sugar and spice, such as ginger, nutmeg, and Cayenne pepper, and will remain on the stomach, and can be taken when solid nourishment cannot; and nothing more speedily allays irritation than this kind of liquid nutriment, it being quickly converted into chyle, and nourishing the lacteals; and it also rapidly becomes absorbed into the circulation, restoring and sustaining the exhausted state, induced by protracted nervous excitement, and which has been before designated as lacteal inanition. They also act as sedatives, no doubt through their nutrient agency, particularly in *delirium ebriositatis*, and mania, and if taken in combination with camphor, and the extract of henbane, succeeded by a milk diet, profound sleep will frequently supervene, and proves the precursor of a speedy restoration.

There are conditions, in which there is not only a want of equilibrium, but an adynamic state of the circulating and nervous systems, and which long precedes, and is frequently the

proximate cause of insanity, especially in cases of hysteria accompanying amenorrhœa, menorrhagia, and other uterine disturbances. When reaction occurs in these conditions, a strictly simple and nutritious diet, principally milk and yolk of egg in any form, or milk-porridge, beef-tea, sago, arrow-root, and simple nourishing puddings, should be resorted to, and will restore the patient to tranquillity and convalescence.

Narcotics, especially opium, although recommended upon very high authority, in large doses, as almost the only valuable therapeutical agents in insanity, have a very doubtful and uncertain influence; and opium has been found mischievous, except as a stimulus, in the excessive prostration attending delirium tremens, and if used must be given in large doses for that object.

Henbane possesses a peculiar agency, independent of its sedative and narcotic powers, and acts in a mild and genial way upon the intestinal canal, producing *peristaltic* action, without any nervous disturbance; and the cobweb of the black spider[1] possesses a similar power, but appears to act more exclusively, and directly upon the brain, both producing sedative effects, without injuriously affecting the head. This may occur, in the case of henbane, from its laxative influence, which always obtains, except in some peculiar states; but the *tela aranei nigri*, will produce sleep, and relieves neuralgia, especially in combination with *hyoscyamus* and steel.

The stimulating agency of opium, is sometimes required, but is not to be depended upon, since it frequently produces disorder of the head and constipation, and also impairs the functions of the stomach; but it is resorted to

[1] Vide 'Elements of Therapeutics,' by N. Chapman, M.D., Phil., 1827, v. ii, p. 187, art. *Tela Aranearum*.

with great success under peculiar conditions of exhaustion, when other remedies, such, as so-called diffusible stimulants, and nutriment are not available, or not able to be administered, when it is given in small doses to rouse vitality, and to stimulate the nervous centres. And in such delicate cases, there is no stimulus so pure, simple, and directly nourishing to the nervous system, as very small doses of *hydrochlorate of morphia.* In febrile conditions, diaphoretics, purgatives, and emetics, and, occasionally, bloodletting topically, in inflammatory attacks, and nervous congestion, may be cautiously used; but even topical bloodletting, should be resorted to with great discretion.

Irritative fever from maniacal excitement, must be distinguished from other conditions of fever, especially as quiet, abstraction of light, and administration of nourishment, will almost always remove it, and also frequently restore the patient to the possession of his senses, and to a state of calmness.

Mechanical and physical remedies, such as cold douches, shower-baths, the *bath of surprise,* so-called rotary motion, and similar expedients, equally with restraint and coercion, are improper, influencing the patient with emotions of nervous excitement and fear, and which ought to be discountenanced, except in a modified and judicious way, in cases in which the assimilative functions are feeble, when warm and cold bathing, and the shower-bath, will be found under proper directions, very useful.

We often find a want of tone of the absorbent and lymphatic systems, especially in the vessels of the tissues or envelopes of the contents of the nervous centres, or parts communicating with them, producing, very often, serous effusion in, between, and amongst those envelopes.

The conditions of debility, resulting from diseases which have left the nervous system exhausted, and the patient in a high state of irritability and excitability, often terminate in hypochondriasis, the proximate causes being almost all traceable to hysteria, uterine disturbance, and dyspepsia, and not to a peculiar temperament, or to any particular state, or condition of the mind.[1] And no therapeutical distinction between dyspepsia and hypochondriasis exists, although it has been attempted by Cullen to establish such; yet the same treatment was, as he states, successful for both.

Walking exercise, carried to the extent of fatigue, in young and vigorous subjects, generally induces sound sleep, which is frequently absent, aggravating these diseases; it also produces perspiration, relieving the lymphatic and exhalent vessels, from a state of torpidity and congestion, a state which often accompanies hypochondriasis; and the restoration of the absorbents and lymphatics, improves the functions of digestion and assimilation; hence, in those cases of uterine disturbance so frequently the proximate cause of hypochondriasis, we find the metallic salt of iodide of potassium an invaluable remedy, especially in combination with steel, in the forms already indicated and prescribed, and also the carbonate of iron, combined with assafœtida, gum, extract of gentian, and Cayenne pepper.

Most cases of insanity, are attended with constipation of the bowels, which of itself is sufficient, in many constitutions, to produce great nervous disturbance, irritation, and excitement, and even mania. This state should be relieved by mild carminative alteratives, particularly directed to increase and restore the secretions of the liver and intestines, and to strengthen the powers of assimilation: which, with judicious

[1] Cullen's 'First Lines,' paragraph 1230, *et seq.*

[illegible] and [illegible] will often restore the [illegible] and the patient to health.

[illegible] of [illegible] and [illegible] and [illegible] manner and treatment are proper adjuncts to the use of [illegible] in the same way as diet and nursing: but to consider the physician as merely an agent to enforce a humane policy for the insane is to take a very low, and indeed very ill instructed, and to consider him a very humble machine in the treatment of mental diseases.

Certain insanity cannot be properly treated, without some degree of isolation and seclusion, and which is necessarily practised, to render the patient and society safe; and these imply restraint, and thus you abridge, but would not deny, the agency, which, under guidance, should always be encouraged. The patient will on many occasions violently implore you to impose restraint, and even confinement; will tell you to secure his hands, since he cannot avoid doing mischief, either to himself or to others; to secure his person, since he knows he shall evade the most watchful surveillance, and destroy either himself or others. But the application of necessary restraint does not require severity. This has been elucidated in the cases quoted p. 142, and also by the following cases, the first of which is described by Dr. Wigan:

"On approaching the patient—who had become instantly calm, when told that the doctor would come to him—the doctor said, 'What is the reason of this disturbance, sir, and why am I called out of bed at this unseasonable hour?' 'Don't be angry, doctor,' was the reply, 'I wish to tell you that I can get my hands at liberty. You see how small they are. You must send to the ladies for a smaller pair

of manacles.' 'There is no danger whatever of that, sir; you are perfectly secured; lie quiet and go to sleep.' In vain did the patient urge with increasing violence the necessity of securing himself more firmly; the doctor refused; when the young man succeeded in extricating one hand, and gave him a violent blow. 'Do you believe me now,' said he. This was an irresistible argument; a pair of ladies' manacles were sent for, and securely fastened. The patient pulled in all directions for some time, and, finding himself quite unable to get his hands out, said, 'All right now, I am quiet. While I knew that there was a possibility of extrication I could not restrain my propensity to kill somebody; I am sure I should have done it, though I tried so hard to prevent it; now that I know myself secure I am quiet. Now do, my dear doctor, sit down and have a little chat with me, I have thoroughly waked you up, and it will be charity to bestow half an hour on me."[1]

A middle-aged female, Mrs. Watson, the mother of a family, had a constant tendency, by day and night, to self-destruction, attended with a pertinacious propensity to destroy her children. She nearly accomplished her purpose, in her own case, by attempting on several occasions to hang herself, and attempted to commit self-destruction by cutting her throat, on more than one occasion; and first drowned one of her children. She was constantly imploring, in the most plaintive and heart-rending tones, that she might be taken care of, saying, "Oh! I shall destroy myself." She was attended for about three years with the greatest kindness, and was at length sent as an incurable, to a county asylum, when her treatment became severe, and she was constantly in a strait-waistcoat. A more mise-

[1] 'The Duality of the Mind,' by A. L. Wigan, M.D.

rable and pitiable maniac could not be imagined. She was there for a considerable period; but, notwithstanding her sad condition, she was perfectly cured within twelve months, and restored to her family. An argument might be raised in her case, that she laboured under imaginary and delusive fears, and gave herself trouble and anxiety, for which she had no cause; and that when she became really affected with trouble and suffering, she distinguished the difference between the imaginary, and the real, and her mind, in consequence, became restored to its equilibrium.

The practice of restraint, is an infringement of personal liberty; yet, to succeed by watching and surveillance, your agents, should possess the finest, and most imperturbable dispositions and tempers, or they will degenerate into annoyances, exciting jealousy and suspicion, and a consciousness of an oppressive inferiority; and the secret is to learn what Shakespeare recommends to—

"Fetter strong madness in a silken thread:"[1]

for the insane are conscious of their helpless state, and secretly *desire* humane protection.

Although an enlightened and civilized policy, is always to be practised in the treatment of insanity, it must be remembered, that we are treating conditions of disease, which are manifested in an anomalous and impracticable form and character; and the deviations and peculiarities which accompany them are different from all analogy; nevertheless, they are accidents of trivial estimation, compared with the diseases from which they spring — the cure of which is our object, and which requires a discriminating, yet firm treatment. These emotional deviations,

[1] 'Much Ado about Nothing.'

in fact, demand the consideration of the physician, only, so far as to facilitate the treatment, and to protect the patient.

It would be an error to assume that non-restraint is complete, even under the most approved system, since padded rooms, strong ticking or canvas dresses, without arm sleeves, "small locks for buttons and button-holes," and muffs denominated "soft gloves," something like a boxing-glove, and a number of attendants quietly assembled, to close upon the patient and carry him, like a child, into a padded room, "which is a quiet chamber, in which he is secluded, and in which, it is all but impossible he can by any means injure himself, and where the exclusion of spectators ordinarily brings tranquillity," certainly do not convey the idea of an absence, or of abuse of necessary restraint.

Thus, it will be seen that a judicious tact, is a necessary quality in the management of madness, directed by intelligence, good feeling, and a proper commiseration of the insane, without pandering to their delusions. Long privation of responsibility, and continued confinement, demoralize the feelings and character of the lunatic, and induce him to practise deceit; which, if it be in any way practised towards himself during his treatment, induces a feeling of disparagement, in his estimate of those around him, and of the patient's own superiority, and a jealous, and suspicious feeling is a characteristic of madness.

Some recommend abstinence from small beer and all malt liquors; but this is a fallacy, since no sedative will sooner quiet and soothe the paroxysms of maniacal frenzy, or allay maniacal excitement than good home-brewed ale, combined with spices, which act as a sedative in calming maniacal excitement and are a desirable liquid nourishment.

Delusions should not be abruptly contradicted, or, on

the other hand, encouraged; but mistakes resulting from delusion, should be explained in a simple, practical, and unobtrusive way; so as to obtain a conviction of the error, and not to wound the feelings, or to induce a sense of inferiority—thus the diseased mind would become more confirmed, and less confused.

The mind is prone to error, notwithstanding the spirit of freedom, and of revelation with which it is inspired. How, then, need we wonder that it should be wrecked upon the difficulties which surround it? Good and evil, are inseparable from our privileged state, as reasonable and accountable beings, and man is the victim of moral epidemy, in a similar sense, to that in which he becomes the victim of physical evil, and under similar social circumstances.

Human passions, conspire to wreck both mind and body; and if it were known upon how narrow a strait is the residence of sound reason, and the disturbing currents which surround it, we should be justly apprehensive. The luxuriant seasons of the human mind, are frequently overcast with clouds, and the same intellectual harvest, shall often produce the radiant bloom of intellect, and its withered fruit. In physical science, if a balance becomes disturbed, its errors can be measured, but the *statics* of reason, when disturbed, are incapable of interpretation, there being no standard, by which reason can be measured.

Moral insanity, manifested by criminal acts of the most pernicious tendency, is an unmitigated evil, its mischief being infectious and frequently communicable;—it is a plague spot, without alleviation by law, or by medical art, comparable to blight, or pestilence, which destroys the products of the earth, or sweeps away its inhabitants, and

should be removed from observation, since irresponsible crime exercises the force of example.

If vice and intemperance had no rule over reason, our plans would be simple, since our motives and incentives would be directed to a pleasing, and also to a very limited object. But by far the larger portion of madness is produced by vice and intemperance.

The charities of England—its greatest pride—abound in funds and endowments, to an extent more than required, if used wisely and economically; but ostentation guides every movement of charity, and architectural schemes and plans, frequently regardless of the home comforts and domestic treatment of the lunatic, are the exclusive objects of regard at the precise moment, which, if lost, is irredeemable. The most unpretending abode is likely to be the most comfortable, and desirable refuge for the lunatic, and unnecessary external grandeur (not forbidding objects of cheerfulness), conveys to the mad mind, a profound sentiment of irony.

No doubt, with our improved ideas of healthful conditions, a normal lunatic establishment could be created upon just and correct principles; and the ground plan of such a building, when perfected, should become the model which, on a large or small scale, might be universally adopted.

Suppose a circular hamlet of villas, consisting of separate blocks of one story each, having the same extent of vacant space between each block as the block itself occupies; built upon a large, elevated, and suitable area. A concentrical communication, and a perfect system of atmospherical diffusion, being also effected by this means; and aided by telegraphic communications, emanating from a central signal house, the site of which, being appropriated as well for the

offices, namely, signals, gas, and water works, magazines, and kitchens; and from which centre, also should radiate tunnelled inclines to each separate villa, to carry provisions, meals, and medicines, thus a perfect system of communication would be formed both by personal assistants, by signals, and by rails; and these offices, occupying as they would a large central area, might be hidden by a suitable surrounding planted screen. And each of these detached villas, might have ornamental gardens, and shrubs arranged round them, and thus be constructed, to produce a pleasing variety in the perspective.

Such a normal lunatic asylum, would be able to supply officers, of every grade and description, from the medical superintendant, to the humblest nurse, for the use of all asylums, public and private in the kingdom.

Lunatic establishments are generally on the voluntary principle, which applies more or less to county lunatic asylums, and the number of strictly charitable lunatic asylums in England is very few. The two, which approach nearest this definition, namely, Bethlehem and St. Luke's, being endowments, have all their objections as well as advantages. The voluntary principle not being national, or cosmopolitan, cannot be evoked at will, and being independent, as its name implies, it is at the best slowly and capriciously brought into action, and can never be governed or directed on any large scale, or for any extensive object.

Since classification of lunatics, is the *pivot*, upon which the whole system of the treatment of madness should turn, the limited finances of separate counties are inadequate to work out this problem, of the policy and discipline of madness. And county asylums, at present, do not in-

clude a system of classification with any success; pauperism being engrafted on the county system, and its objects being mainly the custody of incurable lunatics, it has not yet been able to grasp a scheme, which should exclude incurable lunatics, and to ensure devotion, not only to the custody, but also to the treatment and *cure* of madness.

A centralised union, emanating from a number, or aggregation of counties, which would enable them to establish district hospitals, for the reception of recent and curable cases, and to reject all incurable, epileptic, and idiotic cases, is a very desirable scheme. Such might retain the principle of local direction, and government in its administration, and the visitors might be elected by either parliamentary voters, or parochial rate-payers; the chairmen of quarter sessions, to be considered *ex officio* visitors; and which should include a certain number of medical men, who, it is suggested, might be elected by the suffrages of the qualified practitioners in the district, and who alone should be paid for their duties.

Twelve such institutions, exclusive of St. Luke's and Bethlehem, would provide for all the curable lunatics in Great Britain, and the existing county asylums, would then sufficiently and properly fulfil their object, and provide a refuge for the incurable and the criminal. The visitors should be men fitted by training, and acquaintance with the subject of madness, and should have enlarged views, disciplined by education and inquiry, and be able to devote leisure and perseverance to its duties, and who, in their communication with those who have the care of the lunatic, would endeavour to obtain from them, information of the wants and condition of their patients, and by liberal confidence, inspire a spirit of improvement, which would assist

to pave the way to a better practice, and to discountenance any brutality.

Thus it will be seen, that the policy which should guide the treatment of madness, is simple and with good feeling and intelligence, may be made an agreeable occupation, since truth and mercy should direct it.

> "The quality of mercy is not strained,
> It falleth as the gentle dew from heaven."

So ought the sympathies of the attendant to fall upon the delusions of the insane, soothing and correcting them without harshness, or anything inducing the inspiration of fear, since, although helpless, they are aware that they are different from others, and objects of remark, and are desirous by seeking solitude to avoid provoking a comparison of their condition.

A cheerful countenance and address have a more powerful influence than words, in checking maniacal emotions, if practised by one who has never forfeited the esteem of the patient; and whose office has been to administer only encouragement and advice. This influence over the patient may be acquired even in the first interview, and is seldom forfeited. The physician who, while reading the passing tumult in the countenance of his patient, identifies himself with his feelings, and with his state of mental confusion, and administers comfort and consolation, and who at the same time inspires him with confidence, by presenting truthfulness in his intercourse towards him, will soon obtain a permanent influence for his amelioration.

APPENDIX.

APPENDIX A. A.[1]

(From page 73.)

"The results of pathological anatomy can, however, never have more than a limited application to the physiology of the brain. We are unacquainted with the laws according to which the different parts of the organ participate in the affections of each other, and we can only, in a general way, regard as certain that organic diseases in one part of the brain may induce changes in the function of other parts; but from these facts, and the results of pathological anatomy, we cannot always draw certain conclusions.

"Degenerations in the most various parts of the brain, which appear, from experiment, to have no immediate connection with the central organs of the sense of vision, nevertheless frequently cause blindness; and at this we must be the less surprised, since, even in diseases of the spinal cord, as tabes dorsalis, imperfect amaurosis is a frequent symptom.

"The same remark applies to the relation of lesion of the different parts of the brain to mental diseases; the brains

[1] Müller's 'Physiology,' v. i, p. 838*.

of insane persons frequently presenting degeneration in parts which are not the essential seat of the intellectual functions."

[1] "M. Magendie mentions, that if after the removal of the upper part of the cranium in a living animal, the cerebrum, the optic tubercles, and the cerebellum be removed in successive slices, leaving the medulla oblongata entire above the apparent origin of the fifth pair of nerves, the animal is indeed rendered blind; but it continues to be affected in as lively a manner by pungent odours or tastes, or by irritation of the skin, as if no further injury had been sustained than the loss of blood occasioned by the experiment. The animal cries, if a hair of its whisker be plucked, or if vinegar be held to the nose, and strives with its fore feet to rid itself of the object which incommodes it; the movements of the body are more affected than if the cerebellum alone had been removed. These phenomena may be observed to continue for more than two hours, when the experiment is performed upon an adult hedgehog. The next step which we make, if not more wonderful, is certainly more unexpected than the preceding. It appears by the experiment, which I have last quoted, that the brain may be taken away portion by portion, yet the creature survive, and exhibit sensation and instinct. But let the mutilation be carried to a line further; let that small segment of the medulla oblongata be destroyed, in which the fifth, seventh and eighth nerves rise, and consciousness is at once instantaneously extinguished. Nor is this extraordinary phenomenon to be explained upon the supposition that it is only necessary that a certain quantity of the cerebral organ be left. It turns wholly upon the destruction of one particular segment; for in an animal in perfect health, and with all the frame entire, if that segment alone be injured, life is at once and utterly over. And to mark yet higher the importance of this point in the medulla oblongata, the rest of the nervous system derives its vitality, or, to speak more justly, its participation in the phenomena of conscious-

[1] Mayo's 'Outlines of Physiology,' pp. 229-30.

ness, from its continuity with this point being uninterrupted. The proof or disproof of this position turns, however, entirely upon experiments made upon cold blooded animals. In warm blooded animals, the vitality of the nervous system depends so directly upon the circulation of the blood, that when the latter is interrupted, no satisfactory results can be obtained." [1]

[1] 'Anatomie des Syst. Nerv.,' &c., par F. Magendie et A Desmoulins, p. 560.

APPENDIX B.[1]

(From page 80.)

"The attempts made to estimate the velocity of nervous action have not been founded on sound experimental principles. Haller calculated that the nervous fluid moves with the velocity of 9,000 feet in a minute; Sauvages estimated the rate of its motion at 32,400, and another physiologist at 57,600 million feet in a second. Whilst the galvanic principle and the nervous principle were regarded as identical, the rate at which the latter acts was calculated from the rapidity with which electricity is transmitted through conductors. We shall probably never attain the power of measuring the velocity of nervous action, for we have not the opportunity of comparing its propagation through immense space as we have in the case of light."[2]

[1] Müller's 'Physiology,' v. i, p. 729.

[2] See Haller's 'Elements,' t. iv, p. 572.

APPENDIX C. D.[1]

(From page 80.)

"Any considerable change in the nutritive fluid imbibed by the cells induces an alteration in their organic chemical action, the result of which is either a change in their composition, and, consequently, in their various properties, physical and vital, or the entire loss of their assimilative power. In the latter case the tissue may merely suffer atrophy, or while the old cells are absorbed, new ones, with different properties, and enclosed with a different assimilative power, may be found in their place. For Professor Müller has shown that the primary elements of the various morbid structures are cells which are developed, nourish themselves and grow in the same manner as the healthy tissues."

[2] "But it was not until Schleiden had made known his observations on the development of the cells of vegetables from nuclei or "cytoblasts," that Schwann was led to compare the mode of growth of cellular textures in animals, and to make the discovery that the first step in the formation of all animal tissues is the production of a primary cell."

"The primary cell, both in vegetables and in animals, is, generally, not a simple vesicle, but contains within it another body,—its nucleus. The nuclues is a roundish or oval body, frequently somewhat flattened, most commonly granular, opaque, and apparently solid, but sometimes transparent and vesicular, and containing in its interior one or

[1] Müller, v. i, p. 436.
[2] Op. cit., v. i, p. 398.

two, and sometimes three or four, smaller opaque particles, which Valentin has named nucleoli.

"The phenomena which attended the formation of the primary cell, as observed by Schleiden in plants, and Schwann in animals, are as follows:—In a pre-existing homogeneous substance, which contains the nutritive matter for the future tissue, granules appear; some of these acquire a larger size than the rest, and assume the form of nuclei containing one or two nucleoli. In plants, according to Schleiden, the nucleoli are first formed, and organic matter becomes aggregated around them to constitute the nuclei: nor is this process confined to plants, but takes place, at all events, in some instances in animals. The nucleus having attained a certain size, the cell begins to be developed, and when first recognisable, is so small that the nucleus occupies nearly its entire cavity. As the cell enlarges, the nucleus remains attached to its wall at one side, and for a while increases in size with the cell, but in a much less degree.

"The newly formed primary cell appears to have little firmness; its wall is sometimes granular, and of such thickness as to obscure the nucleus, but in other instances it is homogeneous and exceedingly thin and transparent."

APPENDIX E. F.[1]

(From page 81.)

"*Action of Respiration in the Production of Blood.*—Respiration seems to have an essential share in the process, inasmuch as even in the incubated egg the influence of atmospheric air, and in aquatic animals that of water containing air, seems to be quite necessary for the development of the embryo, and the air in these cases suffers the changes which ordinarily take place in respiration.

"That the blood during respiration undergoes a change necessary to the preservation of life, is proved by death occurring whenever this function is interrupted. A very small portion only of the changes which take place in the passage of the blood through the lungs is recognisable, and that is the change of the dark red colour of the blood to a bright red, which, during its passage through the capillary vessels of the body, generally is converted to a dark red . . .

"The absorption of oxygen, and the separation of a portion of carbon (or carbonic acid) are, therefore, the causes to which arterial blood owes its property of being the sole stimulus of living structures. Venous blood, which has not undergone this change, has a poisonous action on the organs of the body, particularly on the nervous system, and annihilates their irritability; its action being similar to that of carbonic acid, sulphuretted hydrogen, carburetted hydrogen, and some other gases, by which the irritability of the organs of the body is destroyed, and by most of which the arterial blood is darkened in colour."

[1] Op. cit., v. i, p. 158.

"The arterial blood, in its course through the capillary vessels of the body, loses its bright red colour, and becomes again venous. The unknown reciprocal actions between the blood and the organised matter, by which this change is effected, maintains the vitality of the organs, at the same time that it renders the blood incapable of again exercising this necessary vital stimulus until it has regained its arterial character in the lungs. In the process of arterialisation, the blood absorbs oxygen from the atmosphere, and gives out carbonic acid, the oxygen which it absorbs being in greater quantity than the carbonic acid extracted. The same portion of blood acquires and again loses its arterial properties within the period of a few minutes; for it will be shown, at a future page, that the blood circulates through the whole body in that space of time. It is only while in its arterial state that the blood is capable of maintaining life.

"The suppression of the change which the blood undergoes in the lungs produces asphyxia and death, chiefly, as Bichât has shown, by interrupting the functions of the brain and nervous system.

"The necessity for arterial blood is less urgent, however, in new born children, and still less so during the state of hybernation and torpor, and in the lower animals; in the fœtus of the *Mammalia*, the necessity for the aeration of the blood seems to be wholly wanting. The functions most dependent on the arterial state of the blood *are those of the nervous system*, and those of animal life generally. The application of a ligature to all the arterial trunks of a limb deprives it of power of motion, and at last of vitality.

"Great losses of blood produce immediate *asphyxia* in the higher animals; cold-blooded animals, however, survive for a considerable time the abstraction of the greater part of their blood, and frogs live many hours after the removal of the heart, and retain perfect power of motion.

"It results from the facts already stated, *that the sympa-*

thetic nerve is charged as it were with nervous power by the brain and spinal cord, which may be regarded as the sources of nervous influence; but that when once charged, it continnes to emit this influence in the manner peculiar to itself, even when the further supply is for a time diminished. This affords an explanation of a part of the phenomena of sleep. While the *sensorium commune* falls, for the most part, into a state of inaction during sleep, the action of the heart, and that of the intestines, continue with little or no change; for the organs supplied by the sympathetic nerve are independent of a partial and temporary rest of the *sensorium,* as long as they are charged as it were with nervous energy. The nervous principle seems indeed to be the more directed from the central organs towards the sympathetic part of the nervous system during sleep, in proportion as it is less required in the performance of the mental functions and the action of the organs of the senses." [1]

[1] Müller's 'Physiology,' v. i, pp. 149-50, and 786.

APPENDIX G.[1]

(From page 82.)

"The elements of the ganglia of the nerves in the higher animals, and in the human subject have been ascertained by Valentin to be globules of considerable size, which differ from the above described club-shaped bodies merely by their more spherical form, but have like them a nucleus, and in the circumference of this another smaller nucleus, or nucleolus, and frequently also spots of pigment on their surface. One or more fasciculi of fibres, which enter the ganglion form within it a plexus, the fibres assuming a different arrangement, and then issue from it again; while single fibres, or fasciculi of fibres, form an interlacement around the globules of the ganglion. The fibres which form this interlacement come off from the trunk of the nerve and join it again. This description applies to the ganglionic globules generally, as may be easily verified.

"The grey substance of the brain and spinal cord is, according to Valentin, formed wholly of the same globules as the ganglia. The appearance of minute granules is produced by the disintegration of the original globules, which are very soft. The only circumstance in which the globules of the grey substance of the brain differ from those of the ganglia, is that the cellular tissue which invests the former is less firm. In the white substance of the brain there are, according to Valentin, no globules or granules. . . . . On the quantity of the deposit of grey globules depends the degree in which

[1] Müller v. i., p. 656, et seq.

certain parts of the brain differ in colour from the white or fibrous substance. . . . . It would be important to know whether the large globules of the grey substance in the brain and in the ganglia have, or have not, any connection with other parts or with one another. . . . .

"*Distribution of the white and grey systems of fibres in the cerebro-spinal and sympathetic nerves.*—We have already mentioned that the cerebro-spinal nerves contain some fasciculi of grey fibres, and that the sympathetic contains likewise some few fasciculi of white fibres. It has also been shown to be probable that the grey fibres, which have a peculiar structure, derive their origin from the ganglionic globules. These globules, which are so frequent in the ganglia of the sympathetic, are likewise present, though in less number, at those parts of the cerebro-spinal nerves where the fibres of the sympathetic enter largely into their composition, as at the angle of the facial nerve, where it is joined by the vidian, and in the second and third branch of the *nervous trigeminus*. It is evident, therefore, that the sympathetic differs only in a relative manner from the other nerves.

"The mixed cerebral and spinal nerves contain chiefly fasciculi of sensitive and motor fibres, and a few fasciculi of grey fibres, which have a tendency to the formation of ganglia; the sympathetic, on the contrary, contains a few sensorial and motor elements derived from the posterior and anterior roots of the mixed nerves, but consists chiefly of grey organic fibres, corresponding with its distribution to parts which serve principally for the production of chemical changes in the fluids of the body. Hence the frequency of ganglia in the sympathetic nerve; while in the cerebro-spinal system of nerves, if we except the regular ganglia of the posterior roots, ganglia are rare, occurring only where there is a considerable intermixture of grey fibres from the sympathetic.

"*Classification of the ganglia.*—The ganglia of the nerves may be arranged in three classes.

"1. *Ganglia of the posterior roots of the spinal and cerebral nerves, the ganglion of the larger portion of the nervous trigeminus, that of the vagus, the ganglion jugulare superius of the glosso-pharyngeal nerve, and lastly, the ganglion on the small posterior root of the hypoglossal nerve.*" . . . .

"It being shown[1] that the sympathetic regularly receives fasciculi of motor and sensitive fibres from the spinal nerves as its motor and sensitive roots, the existence of a similar relation between it and those cerebral nerves which are analogous to the spinal nerves, in having double roots, becomes very probable.

"The hypoglossal, vagus, and glosso-pharyngeal nerves do, in fact, give roots to the superior ganglia, and thus to the cord of the sympathetic. We do not, however, mean to assert that all the fibres of these cords are motor and sensitive, for such is not the case. The ganglionic or sympathetic nerve then receives roots of sensitive and motor properties from the cerebral nerves which we have named. It likewise receives a similar root from the great spinal nerve of the head, the nervous trigeminus. The vidian nerve is, at least in parts, a root given off to the sympathetic, as will be more distinctly proved in the following chapter. . . . .

"The important labours of Sir C. Bell, relative to the sensitive and motor roots of the nerves, left us in ignorance concerning the sympathetic; but they suggested to intelligent minds the necessity of a complete reform of our notions regarding this nerve. It is but recently that the facts and means contributing to this reform have been published. The earliest that I am acquainted with were made known by Retzius in 1827. He made the remark, that there were grey fibres mixed with the white in the nervous trigeminus, and that these grey fibres issued from certain ganglia, and ran both in the direction peripheral in the branches of the nerve, and also in the central direction towards the gasserian ganglion. Retzius himself deduced

[1] Müller, v. i., 716, et seq.

no physiological conclusions from these important facts. They remained without further application until the year 1834, when more defined expositions of the principles according to which the ganglionic or sympathetic nerve, and its connections with other nerves, are to be regarded, were published by Van Deen and myself. Van Deen laboured to render probable his opinion that the communications of the ganglionic with the cerebro-spinal nerves are destined to impart to the latter vegetative influence, in addition to their sensitive and motor properties, and to the ganglionic nerve a motor influence, and also the faculty of sensibility to impressions under certain circumstances. Van Deen was not acquainted with the facts observed by Retzius, and he does not explain his views as to the nature of the connections between the ganglionic and cerebro-spinal nerves,—namely, as to whether the ganglionic nerve is merely brought into closer relation with the latter nerves by means of its ganglia, or whether it continues its course in them without uniting with their fibres.

"I founded my opinions on the observations of Retzius, and on my own investigations relative to the presence of organic grey fibres running in the peripheral direction in the cerebral nerves—on the fact of the primitive fibres of nerves not uniting with each other in their course—on the origin of the ganglionic nerve from the motor and sensitive roots of the spinal nerves—and on the facts relative to the reflexions of the nervous system. I expressed my conviction not merely that the commonly received notions respecting the supposed use of the connections of the ganglionic with other nerves, namely, the transmission of sympathetic influences, are erroneous, but that the ganglionic, as well as the cerebro-spinal nerves, are compound in structure. I suggested that they contain motor, sensitive, and organic fibres, of which the latter kind alone have the function of regulating the vegetative processes, and have a special relation to the ganglia; that cerebro-spinal nerves are likewise composed of motor, sensitive, and organic fibres,

of which those of each kind have their specific destination, and run their course together without uniting with the others; that the ganglionic nerve consequently differs only in having numerous ganglia, and in containing a large number of grey fibres, which give it a proportionally greyer colour; while, in the cerebro-spinal system, the grey fibres are less numerous, and are seen as grey fasciculi lying in the larger mass of white fibres. The ganglionic nerve is not, however, I observed, equally grey in all parts; the main lateral cords are whitish; the branches of the abdominal ganglia, which are distributed to the viscera of vegetative life, principally grey.

"This is the history of the progress of our knowledge of this subject up to the present time. Remak has brought it to a state of far greater certainty." . . . .

[1] "From all the foregoing facts I arrived at the conclusion, that in the cerebro-spinal nerves, three kinds of fibres must be distinguished; the sensitive and motor, both of which are white, and come from the roots of the cerebro-spinal nerves; and grey organic fibres, which have their origin in the ganglia of the ganglionic or sympathetic nerve itself.

"The observations of Remak have made us acquainted with the peculiar microscopic characters of the grey fibres, by which they may be distinguished from the tubular, sensitive, and motor fibres. They are, namely, much more minute; they are perfectly homogeneous, that is to say, not composed, as far as can be distinguished with the microscope, of a tube and contained portion, and are so pale and transparent, that in a strong light they are not visible; lastly, a completely characteristic appearance is produced by the small roundish or oval bodies which here and there beset their surface. Remak has detected these fibres in the grey fasciculi in many parts of the sympathetic, and has seen perfectly similar fibres more rarely in many cerebro-spinal nerves. To convince one's self of the existence of this peculiar system

[1] Op. cit., p. 720.

of fibres, they must be first examined in a completely grey nerve, in which they are mingled with but very few, if with any, cylindrical fibres. I selected the perfectly grey nervous cord, which leaves the carotid plexus at the inner side of the gasserian ganglion in the calf to join the first division of the fith nerve and the *nervous abducens*, and found it composed nearly entirely of organic fibres, such as those just described. Here and there, a single tubular fibre was seen running over an entire fasciculus of grey fibre, and by the contrast making the difference between them more evident.

"All the grey nervous fasciculi, which we have described as accompanying in their peripheral distribution the first and second division of the fifth nerve, are composed of such fibres. The grey fibres are also contained in the grey fasciculi, which, coming from the otic ganglion, or plexus gangliformis santorini, accompanying the third division of the fifth nerve, and particularly the buccinator branch.

"In other parts of the cerebro-spinal system such favorable opportunities are not afforded for becoming acquainted with the characters of the organic fibres, and it requires a practised eye to recognise them when they are mingled scantily with the more numerous cylindrical fibres. Remak found a few grey fasciculi in most of the cerebro-spinal nerves which he examined. The cords of communication between the sympathetic and the spinal nerves consist principally of tubular fibres; but Remak detected in them some grey fasciculi sent from the sympathetic ganglia to the intercostal nerves, so that there is an interchange of filaments in them.

"In the difference of microscopic character between the sensitive and motor, and the organic fibres, an excellent means is afforded us of ascertaining how far the branches of communication between the cerebro-spinal and ganglionic nerves belong to the one system or to the other. Many nerves, which were formerly regarded as wholly sympathetic, are thus found to be in part of the nature of cerebro-spinal nerves." . . . . .

[1] "2. *Grey or organic fibres in the ganglionic or sympathetic nerves.*—In the former edition of this work, the existence of two kinds of fibres in the sympathetic nerve also could only be shown to be probable, it could not then be satisfactorily proved. It was even then suggested, however, that the ganglia of the sympathetic belong to its organic fibres. Remak has, by minute examination, been able to distinguish, even externally in many parts of the sympathetic nerve, grey and white fasciculi; and the microscope has, in every instance, revealed to him tubular fibres in the latter, and the peculiar organic fibres in the former, kind of fasciculi.

"The results of his long and patient investigation render it very probable also that the organic fibres arise from the globular bodies in the ganglia, and from the caudal prolongations of these bodies; he regards it indeed as a fact, that they do arise thus, for he has very frequently seen coming off from the globules of the ganglia, filaments beset with granules similar to those observed on the organic fibres.[2]

[1] Op. cit., p. 722, et seq.

[2] ["Valentin denies, indeed, the nervous nature of the organic fibres described by Remak, as well as those of minute reticulated fibres seen by Schwann in the mesentery of the frog (see page 654); he believes them to be merely the same knotted (nucleated) and cylindrical fibres which constitute the sheaths of the ganglionic globules, and which are prolonged from the sheaths of those globules so as to form investments for the proper nervous fibres, exactly similar in constitution to the investments which all nervous fibres and the elementary parts of other organs possess. The red colour of the ganglia is due, according to Valentin, to the ganglionic globules, and not to the fibres. The correctness of Velentin's anatomical statements cannot be denied; but although Remak was in error in describing a connection between the ganglionic globules and the so-named organic fibres; and although nucleated fibres similar to these exist in many other parts of the body, yet since, as Henle remarks, we know from Schwann's researches that parts very different in vital properties resemble each other in containing *nuclei*, and since these fibres certainly exist in greater abundance in the sympathetic nerves than would seem to be necessary for the mere formation of an investment of the other nervous fibres, it still appears probable that they have some relation to the functions of that nerve. On the other hand, however, it

"The white tubular fibres have no intimate connection with the globules of the ganglia, and merely pass between them. They can undergo no multiplication in the ganglia; in the whole of their course in the sympathetic system, as in the cerebro-spinal system, they present no division or anastomosis. The organic fibres, on the contrary, may, if they take their rise from the caudal processes of the globular bodies of the ganglia, undergo an increase in them; and the greater prevalence of grey fibres in the peripheral portion of the ganglionic system, while the main lateral cords of the sympathetic are more nearly white, is in favour of this view. The ganglia must therefore, in fact, be regarded as the central organs, or brains of the system of organic fibres, while the sensitive and motor fibres of the ganglionic nerves are derived from the cerebrum and medulla spinalis. From the ganglia arise also the organic fasciculi which accompany the cerebro-spinal nerves; thus the superior cervical ganglion is the radiating point for fasciculi of organic fibres, which join the cerebral nerves, and which here and there form secondary ganglia. Although the organic fibres do not take their rise in the brain and spinal cord, yet it is probable that they are connected with the spinal cord through the medium of the communicating branches between the sympathetic and spinal nerves, so as to derive an influence from the central organs of the cerebro-spinal system; for Remak several times succeeded in finding organic fibres in the roots of the spinal nerves themselves, as well as in the *rami communicantes*.

"What relation the ganglia of the posterior roots of the spinal nerves bear to the system of organic fibres is still uncertain. From the similarity of their structure to that of other ganglia, it might be supposed that they

must be confessed, that stronger proofs must be found before it can be regarded as certain that the supposed organic actions of the sympathetic and other nerves are the functions of the fibres in question." Valentin, 'Nova Acta,' v. xviii, pt. i, p. 127, &c. &c.]

also serve for the origin of those fibres. This, however, would not explain their constant presence on the posterior roots of the spinal nerves. If, as has been frequently imagined, ganglia have an insulating influence on the fibres which traverse them, considering these fibres in the light of conductors, then the ganglia of the posterior roots of the spinal nerves might have the office of deadening the violence of the impression communicated by sensitive nerves to the spinal marrow, and of thus preventing the excitement of the spinal marrow to the productions of reflex motions, which do not take place, except when the impression on the sensitive nerve has a certain degree of intensity. This would agree, too, with the indistinctness of the sensations in parts supplied by ganglionic nerves, of which the ganglia are more frequent. But all this is a speculation resting on a mere hypothesis.

"3. *Functions of the organic fibres.*—With reference to the actions and vital properties of the grey organic fibres, two opinions may be held, of which we will now consider the relative tenability. According to one opinion, the fibres in question, together with the globules of the ganglia, rule over the involuntary movements; according to another, they preside over nutrition, secretion, and the chemical processes generally. In favour of the first view may be adduced the fact, that the *cæliac ganglion* has a decided influence on the motions of the intestines; for on touching the ganglion with caustic potash, an immediate increased activity and acceleration of the peristaltic motions take place. A similar effect is produced, however, by the application of galvanism to the *splenic nerve* before its entrance into the ganglion. It is possible, indeed, that the ganglia may exert an influence on the motor fibres that pass through them, yet at the same time it must be recollected that the globules of the ganglia are more immediately connected with another set of fibres, —*the organic*. Indeed, the probability that an intimate relation does exist between the ganglia and grey fibres, is shown by the frequent occurrence of small ganglia on fasci-

culi which are perfectly grey; they are very easily seen, for example, on the grey fasciculi which accompany the first and second divisions of the fifth nerve in the calf. It is probable, therefore, that the functions of the ganglionic globules, and that of the organic fibres, are the same.

"The mere existence of distinct, sensitive and motor fibres would, *à priori*, lead us to expect that there should be other special fibres to rule over the vegative processes of the body. The nerves have a most marked influence on secretions, and if there were but one kind of nerves for the regulation of the movements and the chemical processes, the increase of a secretion by nervous influence ought to be always attended with spasm, and spasm with increased secretion; while the two phenomena are often met with separately, just as paralysis of the motor power occurs without loss of sensation, and paralysis of sensation without loss of motion. If, moreover, we consider how frequently the grey fibres join the trigeminus, abducens and fascial nerves, in the first of which they can be traced distinctly in their course towards the mucous membranes of the mouth and nose; if we recollect that in the tympanum there is a plexus, formed principally of organic filaments, destined for the supply of the mucous membrane; and that no involuntary motions are performed by the mucous membranes, or even by the parts to which the second division of the fifth nerve, and the nervous abducens, are distributed, we shall at once perceive the much greater probability of the second opinion—namely, that the organic fibres in the cerebro-spinal, as well as in the ganglionic nerves, have the function of regulating the organic processes of nutrition and secretion. This view is much favoured too, by the fact that the sympathetic receives from the motor roots of the spinal nerves motor *tubular fibres*, on which the involuntary motions must be dependent. If this be really the function of the organic fibres, the motor nerves of the heart ought to consist principally of the white tubular fibres. And such is, in fact, the case.

"The nervous principle is generated and regenerated in the central organs.

"The central organs have the power either of reflecting the centripetal actions of sensitive nerves upon motor nerves, or of communicating them to the *sensorium commune*, the seat of consciousness. By the central organs, too, the organic actions of the nerves are maintained in unimpaired power; by them the nervous principle is constantly generated, and regenerated; and without them the power and excitability of the nerves as conductors of nervous action cannot be long preserved. This is the general definition of the relation in which the brain and spinal cord stand to the nerves. The correctness of this definition is readily proved by reference to facts already detailed.

"The only difference between the cerebro-spinal nerves and the organic nerves, in their relation to the central organs, is, that the former issue much more directly from them; while the organic nerves, although their fibres are in company with the cerebro-spinal nerves brought into communication with the brain and spinal cord, nevertheless have subordinate central organs in their ganglia and plexuses, from which the organic nervous influence more immediately emanates; still, however, the action of this organic system cannot be long maintained when cut off from its communication with the brain and spinal cord. . .

"Sensation and voluntary motion are the more remarkable animal properties.[1] . . . .

"The functions which especially distinguish animal beings, namely, sensation, motion, thought, &c., appear to be the end of animal existence; they would characterise the animal although it existed only a moment. The older physiologists named them *animal*, in contradistinction to the *organic functions* . . . .

"The circulation in animals derives its impelling force, not from external influences but from the contraction of a central organ, the heart. It is still uncertain whether a perfect circulation is an absolute predicate of animals; at

[1] Op. cit., p. 32, et seq.

all events, in many simple animals neither heart nor vessels have at present been discovered . . . .

"In animals, the reciprocal action of circulation, respiration and the nervous system is actually necessary to life. . . . .

"The respiratory movements are dependent on nervous influence; but the nerves do not exert this influence unless supplied with blood which has been aerated in the lungs; and the blood again is not sent to the different organs, and, therefore, not to the nerves, without the contractions of the heart are performed; while the heart in its turn is dependent on the influence of arterial blood and of the nerves. The brain, heart, and lungs, therefore, may be likened to the main wheels of the animal machine, each acting on the other, and all set in motion by the change of material which takes place in respiration. . . . .

"The necessity of new matter, caloric, water, and atmospheric air for the development, subsistence, and growth of organized bodies, is absolute. . . . .

"The nutriment, in the first place, is not merely a stimulus of the organic body; it is itself susceptible of life, it is a stimulus which vivifies and can itself receive vitality. Man in the healthy state can scarcely dispense with food for longer than a week without fatal consequences: the higher brutes do not live many weeks without it; while reptiles, on the contrary (especially serpents and chelonians), have been known to fast for months.

"Water, whether it enters as such into the composition of the organic matters or contributes its elements to their composition, is also absolutely essential in its uncombined state to the manifestation of life; since the animal tissues, unless they are moist with water, are incapable of living.

"Atmospheric air is so essential for the manifestation of the vital phenomena, that in the higher animals, life does not subsist a moment without respiration, without the changes in the blood effected by respiration, and without the influence of blood so changed upon the organs . . . . but this other

change which the blood effects in the organs by virtue of its aeration in the lungs can be omitted in reptiles but for a short time, in man only for a few seconds . . . . . M. Edwards has observed that newly-born warm-blooded animals have most need of external warmth, and cannot live without it, while they can live under water without breathing much longer than adult animals.[1] . . . .

The simplest animals can longest dispense with these stimuli; mollusca, and insects as well as the scorpions have been kept for months without food. Serpents and tortoises also live for months without food, while man in the healthy state can scarcely survive a week. Several insects will live for days in mephitic gases; the larvæ of the œstrus, for example, according to the experiments of Van der Kolk, live for a long period in irrespirable gases. . . . The signs of life continue for a longer period in young animals also, probably on account of the greater simplicity of their structure. . . . .

" 'Those organized bodies only,' Autenrieth says, 'which constantly strike fresh roots, as the creeping plants, for example, by means of runners, or, as many trees, by means of descending branches, do not die. In all these cases the new sprout forms, at one period, a part of the old individual, at the same time that it is a new and independent being. But even in these plants the old stem always perishes, and the vital force continues active only in the new offset, which in its turn continues to extend itself on the one side, while it dies on the other.

" What here takes place connectedly, namely, the decay on the one side, and the formation of a new living body on the other, is effected in an uninterrupted manner in man and the more perfect animals. The young is separated from the parent as a new living body, before the old being

[1] Edward's 'De l'Influence des Agens Physiques sur la Vie,' Frorieps Natiz, 150-1. See also Legalloi's 'Exper. sur le Principe de la Vie.'

perishes, and the original individual dies, while the species seems to be immortal.[1] . . . .

[2] "The impulse to these changes is given by respiration; the blood, undergoing a constant change by the respiratory process, again effects constant changes of composition in the organs to which it is distributed. . . .

[3] "The cause of the particular mode of existence of each part of a living body resides in the whole. . . . And since the different parts of an organized body are heterogeneous members of one whole, and essential to its perfect state, the trunk cannot live after the loss of one of these parts. . . . .

"In the higher animals, and in man (different from very simple animals or plants), there are certain organs, that is, parts differing in their properties and functions which cannot be removed without destruction of life, and of our idea of the whole; and such organs also only occur singly, as brain, spinal marrow, lungs, heart, and intestinal canal. . . .

"No part, however, of one of the higher animals can continue to live when separated from the body, for no one part contains all the organs essential to the whole. The ovum, the germ itself, alone possesses this power; for at the time of its separation from the parent animal, the vital force has not formed in it the essential parts of the whole; and yet it becomes developed into a new integral being. . . . .

"Inorganic bodies are divisible in a much more extended sense without the parts losing the chemical properties of the whole; they may be divided (to use the common expression) *ad infinitum*, that is, according to the atomic theory, into the ultimate atoms which, on account of their minuteness, elude the senses; and in chemical compounds, into molecules which are formed of the different component atoms, and which are likewise not recognisable by the senses.

"To this character of inorganic bodies, however, crystals form an exception, since they cannot be reduced by division

[1] Autenrieth 'Physiol.,' i, 112.
[2] Müller's 'Phys.,' p. 40.
[3] Op. cit., p. 19, et seq.

to their ultimate particles without losing some of their properties. These bodies can be divided with facility only in certain directions, and the portions thus obtained are often different in form from the whole; for which reason some persons regard crystals also as 'individuals,' which exist from the continuance of the force which formed them, and cease to exist when external influences, chemical (atmospheric) or mechanical, overcome their force of crystallization or hardness.

"But even if crystals are regarded as individuals in this sense, there is still this great distinction between them and organized bodies, that the molecules of crystals are homogeneous throughout, and that crystals are divisible at least into homogeneous aggregates of molecules, while organized bodies are composed of parts perfectly dissimilar from each other, such as tissues endowed with peculiar properties. Organic combinations, moreover, never occur in a state of crystallization in organized bodies during life. . . .

"Crystals, on the contrary, present no adaptation of form to an intended action of the whole, because the whole crystal is not a body composed of a number of dissimilar mutually adapted tissues, but is produced merely by the aggregation of similar elements or formative particles, all subject to the same laws of crystalline attraction. Crystals, therefore, increase by the aggregation of new particles on the external surface of the parts ready formed; while in the organized body, the formation of the parts situated side by side, each having a different organization, is for the most part contemporaneous; so that the growth of organized bodies takes place in all particles of their substance at the same time, while the increase of the mass in organic bodies is produced by external apposition.[1] . . . .

[2] "The component tissues of organized bodies are,

[1] [Professor E. H. Weber has made some other very interesting comparisons between organizations and crystallization in his general anatomy. Hildebrandt's 'Anat.,' 1ster Band.]

[2] Op. cit., p. 23.

moreover, never crystalline, for although some kinds of fatty matter are crystalline in the pure state, it is only when they are subjected to external influences and withdrawn from that of life. The same is the case with sugar, urea, and lithic acid. Most of the organic substances and fluids do not crystallize even when removed from the living body. The spinal canal and the cranial cavity of the frog have, surrounding the central parts of the nervous system, a layer of white pulpy matter which, according to Ehrenberg[1] and Huschke, consists of microscopic crystals of carbonate of lime." . . . . . .

"So also in treating of the physiology of the nerve, it will be shown, that unless the nerves had been divided into a certain number of primitive fibres, which do not communicate one with another, their local action—local circumscribed sensation—would be impossible. . . . . .

"And the blood having suffered the necessary change by the action of the vital stimuli, in its turn stimulates all the organs of the body, that is, produces in them by the interchange of ponderable and imponderable matter, certain organic changes of composition essential to the manifestation of life, the old components of the organs being at the same time in part decomposed and cast off.

"In animals the nerves also effect important 'material' changes in the organs; and their active force, probably an imponderable agent, is an important internal vital stimulus."[2]

[1] [In diseased states crystallization not unfrequently takes place within the body; sometimes apparently as the immediate result of the morbid process, as in the formation of certain arthritic concretions, but more frequently perhaps in consequence of subsequent chemical changes ensuing in matters already eliminated from the vessels, or of the removal of a part of the solvent fluid; to which causes we must refer most biliary and urinary calculi, and the crystals of calcareous and soda salts formed in the crusts of the intestinal ulcers, and in the intestinal excretions in typhus, as well as in carcinomatous tumours, the discharges from them in gangrenous parts, as observed by Schoenlein. (Müller's 'Archiv,' 1836, p. 258.]

[2] Müller's 'Phys.,' i, p. 19, et seq.

"And Reil says, 'Form of matter is itself a phenomenon, which depends on another phenomenon, namely, the elective affinity of the elements and their products.' Hence it would follow, that if the elementary composition were alone the cause of the organic forces, it would be at the same time the formative principle itself. Now, since in organized bodies immediately after death the elementary composition of the organic matter does not appear to be different from that of bodies still living, Reit must admit the existence of other more subtile elements not recognisable by chemical analysis, which are present in the living body, but are wanting after death.

"Into the composition of the organic matter of the living body there must enter an unknown (according to Reil's theory, subtile material) principle, or the organic matter must maintain its properties by the operation of some unknown forces.

"Whether this principle is to be regarded as an imponderable matter, or as a force or energy, is just as certain as the same question is in reference to several important phenomena in physics; physiology in this case is not behind the other natural sciences, for the properties of this principle, as displayed in the functions of the nerves, are nearly as well known as those of light, caloric, and electricity in physics.

"Parts frozen, stiff, and deprived of sensation and motion, are observed gradually to recover animation, which extends into them from the borders of the living parts. This passage of the vital principle, from one part to another, is still more manifest on the removal of pressure from a nerve, after that state has been produced in which the limb is said to be asleep.

"The fibrin effused in inflammation on the surface of an organ is observed to become endowed with life and organization, as is shown by the changes produced in the animal matter contained in the vessels, for instance, in the lymph and chyle, which latter fluid, during its progress through the

lacteals, acquires new properties; from the coats of the blood-vessels, again, the organic principle exerts an influence on the blood, maintaining its fluidity; for out of the vessels the blood coagulates under almost all circumstances, unless it has undergone some chemical change. . . . .

"From all these facts, the existence of a force which is often rapid in its action, and is capable of extending from one part to another, or of an imponderable matter, is evident; nevertheless, we are by no means justified in regarding it as identical with the known imponderable matters, or general physical forces—caloric light and electricity, a comparison which is refuted by any close examination.

"The researches on the so-called animal magnetism at first promised to throw some light on this enigmatical principle or imponderable matter. It was thought that by one person laying his hand upon, or passing it along the surface of another, and by other procedures, remarkable effects were produced, arising from the overflow of the animal magnetic fluid; some, indeed, have imagined that, by certain operations, they could produce accumulation of this hypothetic fluid.

"These tales, however, are a lamentable tissue of falsehood, deception, and credulity; and from them we have only learned how incapable most medical men are of instituting an experimental investigation, how little idea they have of a logical criticism, which in other natural sciences has become a universal method.

"There is no single fact relating to this doctrine which is free from doubt, except the certainty of endless deceptions; and in the practice of medicine there is also no fact which can be connected with these wonders, except the often repeated, but still unconfirmed, accounts of the cure of paralysis by investing the limbs with the bodies of animals just killed, and the willingly credited fables of the restoration of youth to the old and diseased, by their being in the proximity, and exposed to the exhalation of healthy children, and *vice versâ*. . . . .

"The action of the vital or organic force is, however, not independent of certain conditions. The necessary elementary combination, and the vital principle itself, may be present, and yet not manifest themselves by the phenomena of life. This quiescent state of the principle, as it is seen in the impregnated germ of the egg before incubation, or in the seeds of plants before germination, must not be confounded with the state of death; it is also not life, but a specific state of 'capability of living.'

"Life itself, namely, the manifestation of the organic and vital force, begins under the influence of certain necessary conditions; these are warmth, atmospheric air (in ova which are hatched in water, the air diffused through the water), and the supply of moist nutritive matters, that is to say, of nutriment and water; and these conditions do not cease to be necessary for the continued manifestation of life. . . . . .

"The ova of animals will retain for a long period their capability of development, if withdrawn from the influence of the atmosphere and of caloric. . . . . .

"Treviranus adduces the observations of Van Swieton, that the seeds of the mimosa have germinated at the end of twenty years, and beans after two hundred years; and cites another observation, according to which an onion, taken from the hands of an Egyptian mummy, perhaps two thousand years old, was made to grow. As soon, however, as it is subjected to the external influences above mentioned, the germ, if capable of development, becomes developed, or it undergoes putrefaction; while the already developed organism, when the conditions necessary for its future growth fail either falls into a state of apparent death, as in hybernation, or it dies. The quiescent vital force of the germ, therefore, requires no external stimuli for the maintenance of its passive existence; but these stimuli are very necessary for the developed and active life." . . .

"The soul (anima) spoken of by Stahl, is the organizing power or principle which manifests itself in conformity with a rational law. But Stahl has gone too far in placing the mani-

festations of soul, combined with consciousness, on a level with the organizing principle; the operations of which, though in accordance with design, obey a blind necessity.

"The organizing principle, which according to an eternal law creates the different essential organs of the body, and animates them, is not itself seated in any particular organ; it continues in operation up to the time of birth in anencephalous monsters; it modifies the already existing nervous system, as well as all the other organs in the larvæ of insects during their transformation, causing the disappearance of several of the ganglia of the nervous cord, and the coalescence of others; by its operation during the transformation of the tadpole to the frog, the spinal marrow is shortened as the tail become atrophied, and the nerves of the extremities are formed.

"This principle thus acting conformably to design, but without consciousness, is also manifested in the phenomena of instinct. There is great beauty and truth in the saying of Cuvier, that animals acting from instinct are, as it were, possessed by an innate idea, by a dream. But that which excites this dream can be nothing else than the organizing principle, the 'ultimate cause' of the being. . . .

"The existence of the organic principle in the germ, and its apparent independence of any special organ in the adult, as well as the fact that it is manifested in plants, in which both nervous system and consciousness are wanting, prove that this principle cannot be compared with mental consciousness, which is an after product of development, and has its seat in one particular organ." . . .

"Mind can generate no organic products, it can merely form conceptions; our ideas of the organized beings are conscious conceptions of the mind. The formative or organizing principle, on the contrary, is a creative power modifying matter blindly and unconsciously, according to the laws of adaptation."[1]

[1] Müller's 'Physiology,' v. i, p. 25, et seq.

APPENDIX H.

"It has been remarked, that of the powers of the mind, the memory is the first to decay. Old age, which impairs the mind, makes its first inroad on the memory. Wine, while it raises the animal spirits and stimulates the fancy, at the same time disturbs the memory. After injuries of the head, that have eventually been followed by idiotcy, the failure of the memory has been the first mental symptom observed. The failure of memory is, perhaps, sometimes considered the only impairment of the mind, when in fact its other powers are likewise injured, inasmuch as an alteration is much more readily detected in the memory than in any other faculty.

"It is possible, likewise, that in many instances it is more properly the recollection than the memory which suffers; the remembrance is not lost, but the faculty of finding it in the mind, so that the change would be more justly stated to be in an impairment of the liveliness and rapidity of association. I have heard it observed of old men, that their memory has become impaired, but that their understanding has remained as strong as formerly, only slower in its operations. A supervening slowness of association would account, in these instances, for all the phenomena observed. How much we may remember which we cannot recollect, is shown by a curious class of cases, several of which have been collected by Dr. Prichard, in his work upon the nervous system, from which I shall extract the following: —

"A man was brought into St. Thomas's Hospital who had received a considerable injury of the head, but from which he ultimately recovered. When he became convalescent, he spoke a language which no one about him could comprehend. However, a Welsh milkwoman came one day into the ward, and immediately understood what he said. It appeared that the patient was a Welshman, and had been absent from his native country about thirty years. In the course of that period he had entirely forgotten his native tongue, and acquired the English language. But when he recovered from his accident, he forgot the language he had been so recently in the habit of speaking, and regained the knowledge of that which he had originally acquired and lost."[1]

"A student at an university in the United States, who is now one of the most respectable clergymen in that country, possessed a tolerable share of classical knowledge, when the consequences of a fever, which affected his brain, deprived him entirely of his former acquisitions. In fact, he had now become so ignorant, that he was not only unable to read a Latin book, but even knew nothing of the grammar. When he had regained his bodily health, being of a persevering disposition, he began again the first rudiments; everything was quite new to him; he passed through the accidence and syntax in his grammar, and was learning to construe, when one day, as he was making a strong effort to recollect a part of his daily lesson, the whole assemblage of the ideas which he had formerly acquired and lost, suddenly reappeared to his mind, and he found himself able to read and understand the Latin authors as he had done before his illness."[2]

[1] Dr. Tupper's 'Inquiry into Gall's System of Craniology.'

[2] Mayo, pp. 217-18-19.

APPENDIX I.

(From page 135.)

Nicolai's account of his own case.[1]—"During the ten latter months of the year 1790, I had experienced several melancholy incidents, which deeply affected me, particularly in September, from which time I suffered an almost uninterrupted series of misfortunes, that afflicted me with the most poignant grief. I was accustomed to be bled twice a year, and this had been done on the 9th of July, but was omitted to be repeated at the end of the year 1790.

"I had in 1783 been suddenly taken with a violent vertigo, which my physicians imputed to obstructions in the fixed vessels of the abdomen, brought on by a sedentary life, and a continual exertion of the mind.

"This indisposition was successfully removed by means of a more strict diet. In the beginning I had found the use of leeches applied to the arms particularly efficacious, and they were afterwards repeated two or three times annually, when I felt congestions in the head. The last leeches which had been put on previous to the appearance of the phantasms of which I am about to speak, had been applied on the 1st of March, 1790; less blood had consequently been evacuated in 1790 than was usual with me, and from September I was constantly occupied in business

[1] Dr. Hibbert, 'On the Philosophy of Apparitions.'

that required the most unremitted exertions, and which was rendered still more perplexing by frequent interruptions.

"I had in January and February of the year 1791 the additional misfortune to experience several extremely unpleasant circumstances, which was followed on the 24th of February by a most violent altercation. My wife and another person came into my apartment in the morning in order to console me; but I was too much agitated by a series of incidents, which had most powerfully affected my moral feeling, to be capable of attending to them. On a sudden I perceived, at about the distance of ten steps, a form like that of a deceased person. I pointed at it, asking my wife if she did not see it? it was but natural that she should not see anything; my question therefore alarmed her very much, and she sent immediately for a physician. The phantasm continued about eight minutes. I grew at length more calm, and being extremely exhausted, fell into a restless sleep, which lasted about half an hour. The physician ascribed the apparition to violent mental emotion, and hoped there would be no return; but the violent agitation of my mind had in some way disordered my nerves, and produced further consequences, which deserve a more minute description.

"At four in the afternoon the form which I had seen in the morning reappeared. I was by myself when this happened, and being rather uneasy at the incident, went to my wife's apartment, but there likewise I was prevented by the apparition, which, however, at intervals disappeared, and always presented itself in a standing posture. About six o'clock there appeared also several walking figures, which had no connection with the first. After the first day the form of the deceased person no more appeared, but its place was supplied with many other phantasms, sometimes representing acquaintances, but mostly strangers: those whom I knew were composed of living and deceased persons, but the number of the latter was comparatively small. I observed the persons with whom I daily conversed did not

appear as phantasms, these representing chiefly persons who lived at some distance from me.

"These phantasms seemed equally clear and distinct at all times, and under all circumstances, both when I was by myself and when I was in company, and as well in the day as at night, and in my own house as well as abroad; they were, however, less frequent when I was in the house of a friend, and rarely appeared to me in the street. When I shut my eyes those phantasms would sometimes vanish entirely, though there were instances when I beheld them with my eyes closed; yet when they disappeared on such occasions, they generally returned when I opened my eyes. I conversed sometimes with my physician and my wife of the phantasms, which at the moment surrounded me; they appeared more frequently walking than at rest, nor were they constantly present. They frequently did not come for some time, but always reappeared for a longer or shorter period, either singly or in company, the latter, however, being most frequently the case. I generally saw human forms of both sexes, but they usually seemed not to take the smallest notice of each other, moving as in a market-place, where all are eager to pass through the crowd; at times, however, they seemed to be transacting business with each other. I saw also several times people on horseback, dogs, and birds. All these phantasms appeared to me in their natural size, and as distinct as if alive, exhibiting different shades of carnation in the uncovered parts, as well as different colours and fashions in their dresses, though the colours seemed somewhat paler than in real nature; none of the figures appeared particularly terrible, comical, or disgusting, most of them being of an indifferent shape, and some presenting a pleasing aspect. The longer these phantasms continued to visit me, the more frequently did they return, while at the same time they increased in number. About four weeks after they had first appeared, I also began to hear them talk; the phantoms sometimes conversed among themselves, but more frequently addressed their dis-

course to me; their speeches were commonly short, and never of an unpleasant turn. At different times there appeared to me both dear and sensible friends of both sexes, whose addresses tended to appease my grief, which had not yet wholly subsided; their consolatory speeches were in general addressed to me when I was alone. Sometimes, however, I was accosted by these consoling friends while I was engaged in company, and not unfrequently while real persons were speaking to me. These consolatory addresses consisted sometimes of abrupt phrases, and at other times they were regularly executed.

"Though my mind and body were in a tolerable state of sanity all this time, and these phantasms became so familiar to me that they did not cause me the slightest uneasiness, and though I even sometimes amused myself with surveying them, and spoke jocularly of them to my physician and my wife, I yet did not neglect to use proper medicines, especially when they began to haunt me the whole day, and even at night as soon as I waked.

"At last it was agreed that leeches should be again applied to me as formerly, which was actually done April 20th, 1791, at eleven o'clock in the morning. No person was with me besides the surgeon; but during the operation my chamber was crowded with human phantasms of all descriptions. This continued uninterruptedly till about half an hour after four o'clock, just when my digestion commenced. I then perceived that they began to move more slowly. Soon after their colour began to fade, and at seven o'clock they were entirely white. But they moved very little, though the forms were as distinct as before; growing, however, by degrees, more obscure, yet not fewer in number, as had generally been the case. The phantoms did not withdraw nor did they vanish, a circumstance which previous to that time had frequently happened. They now seemed to dissolve in the air, while fragments of some of them continued visible for a considerable time. About eight o'clock the room was entirely cleared of my fantastic

visitors. Since that time I have felt twice or three times a sensation as if these phantasms were going to reappear, without, however, actually seeing anything. The same sensation surprised me just before I drew up this account, while I was examining some papers relative to these apparitions, which I had drawn up in the year 1791."

APPENDIX J.

"On an average the weight or pressure of the atmosphere amounts to 14½ lbs. weight on each square inch of surface of the earth, and as fluids press equally in all directions, every square inch of surface, whatever may be its position, must be subject to the same pressure. The surface of the human body, as well as that of animals in general, has to sustain this pressure; and it will be found by calculation that the whole surface of a middle-sized person will have to support from 15 to 20 tons of pressure, all acting inwards, and having no other mechanical tendency than that of squeezing or compressing the materials of which the body is composed into a less compass."

"The *weight* of the atmosphere . . . varies in this part of the earth from one twelfth to one fifteenth of the whole weight at certain times, but these variations are gradual, so that it requires some days or weeks before the weight passes from one extreme to the other."

"The above is a statement of facts, . . . but a very difficult question arises out of them. How is it that the animal frame is utterly insensible of the whole, or of any part of this enormous pressure upon it? . . . I have never met with a satisfactory answer to this question, and I doubt whether such a one has ever been given . . . . to elucidate the phenomena arising from aërial pressure on the animal economy."

Dr. Dalton ascertained the following facts, and arrived at

the following conclusion amongst others: which we will notice under the term

Diathetics.

" . . . Bones, and flesh, and blood are all heavier than water, some more, some less; . . . that the whole substance of the body is pervious to air, and that a considerable portion of it constantly exists in the body during life, subject to increase, or diminution, according to the pressure of the atmosphere, in the same manner as it exists in water; and further, that when life is extinct, this air in some degree escapes, and renders the parts specifically heavier than when the vital functions were in a state of activity. That air is also drawn out by the agency of the air-pump, or the cupping-glass applied to a part, thus making the part so applied small, and to be in pain. To what limit warm-blooded animals could bear the rarefaction of air, so as to subsist, has not, that I am aware of, been determined with much precision. . . . Ascents in balloons have been made until the atmospheric pressure was reduced more than one half."[1]

"The present air we breathe at any time consists of an intimate mixture of various elastic fluids or gases in different proportions. Those properties of the atmosphere called its salubrity, or insalubrity, depend principally upon the greater or less quantity of one of its constituent principles, *vital* or *dephlogisticated* air. Whether the superior regions of the atmosphere consist in like manner of various elastic fluids, or whether the fluids are the same, or different from those below, cannot, from the nature of the case, be determined experimentally. The figure of the exterior surface of the atmosphere would, from the principles of gravitation, be

[1] Extracts from 'Memoirs of the Literary and Philosophical Society of Manchester,' v. v, pp. 290-2, et seq.; Table of article on 'Physiological Investigations arising from the Mechanical Effects of Atmospheric Pressure on the Animal Frame,' by John Dalton, F.R.S.

similar to that of the earth, or of an *oblate spheroid;* or, its height, and quantity of matter about the equator, would be something greater than at the poles, to preserve an equilibrium everywhere, owing to the centrifugal force, which is greatest at the equator. The density of the atmosphere, supposing it of an uniform temperature, and alike constituted everywhere, would decrease in ascending in a geometrical progression; thus, if the density at one mile high was 1, and that at four miles high $\frac{1}{2}$, then that at seven miles high would be $\frac{1}{4}$th, at ten miles high $\frac{1}{8}$th, &c. I say these circumstances *would be, were it not for the sun,* or the principle of heat, which it seems to produce; but by means of the unequal diffusion of this principle, the circumstances are very materially different.

The mean annual temperature of the air of the earth's surface decreases in going from the equator to the poles. Mr. Kirwan[1] states, the mean annual heat at the equator is 84°, and that at the pole 31°. Moreover, the temperature of the air over any place in clear, serene weather, decreases in ascending above the earth's surface, nearly in an arithmetical progression, and at the rate of 1° for every hundred yards. Experience proves this, as far as to the summits of the highest mountains, which is about three miles, and hence it may be inferred, to be so above that height. The great heat in the torrid zone, rarefies the air by increasing its elasticity; consequently, the equilibrium of the atmosphere is disturbed. The rarefied air, ascending into the higher regions, where, meeting with little resistance, it must flow northward and southward; the pressure upon the northern and southern regions is thus increased, and a current must set in below, towards the equator, to restore the equilibrium. Hence the higher the temperature within the torrid zone, swells the atmosphere there, and raises it, or at least the gross parts of it, to a much greater height than elsewhere; *whilst in the frigid zone it is contracted by cold.* This is the effect of the different temperatures at the

[1] 'Estimate of the Temperature of Different Latitudes.'

earth's surface; but the increase of cold in ascending, destroys the law of decrease in density above mentioned, and greatly contracts the height of the atmosphere, as deduced from such law; though this circumstance has perhaps *no effect upon the figure of the* atmosphere." [1]

"Some of the most important of the researches of Dr. Prout were those into the nature of the atmosphere. The apparatus for conducting the necessary experiments was perfect of its kind; and a very curious fact relative to the cholera was brought to light by its means. For six months previous to the actual breaking out of the cholera in 1832, Dr. Prout had been, day by day, laboriously endeavouring to determine, with the utmost nicety, the weight of a given quantity of air, under precisely the same circumstances of temperature and pressure. On the 5th of February, 1832, the positive weight of the air suddenly appeared to rise above the usual standard. This was attributed, at the time, to some accidental error or derangement in the apparatus, and the succeeding observations were made with the most rigid scrutiny; but no error or derangement whatever could be detected. On the days immediately following, the weight of the air still continued above the standard; and this augmentation of weight continued during the whole time these experiments were carried on; that is, about six weeks. The conclusion drawn from this was, that the cause of the cholera was a poison in the air, whose high specific gravity, and feeble diffusive powers, kept it near the earth's surface, along which it invariably crept."

Sir Humphry Davy says as follows: "There are probably few chemical operations which electrical changes do not influence, and either increase or modify. In the casting of iron, for instance, the oxyde formed by the contact of moisture, becomes the negative surface, and exalts the oxydibility of the mass of metallic iron, *and the rust consequently extends in a circle.*" [2]

[1] 'Meteorological Observations and Essays,' by John Dalton, D.C.L., F.R.S., 2d edit., Manchester, pp. 74, et seq., 1850.

[2] 'The Philosophical Magazine and Annals,' v. i, p. 198.

APPENDIX K.

"The phenomenon of attraction and repulsion by amber, which originated the term *electricity*, is as unlike that of the decomposition of water by the voltaic pile, as any two natural phenomena can well be. It is only because the historical sequence, of scientific discoveries has associated them, by a number of intermediate links, that they are classed under the same category."[1]

"Electricity, again, was named from the substance in which, and magnetism from the district where, it first happened to be observed; and a chain of intermediate phenomena have so connected electricity with galvanism, that they are now regarded as the same force, differing only in the degree of its intensity and quantity, though for a long time they were regarded as distinct. I have used, in contradistinction, the terms *dynamic*, and *static*, to represent the different states of magnetism, the application I have made of these terms, may be open to some exception, but I know of no other words which will so nearly express my meaning. The static condition of magnetism, resembles the static condition of other forces, such as the state of tension existing in the beam and end of a balance, or in a charged Leyden phial. . . . . I believe no magnet can exist in an absolutely stable state, though the duration of its stability will be proportionate to its original resistance to assuming a *polarized condition*." Again, "There is every

[1] 'Correlation of Physical Forces,' by W. R. Grove, Esq., M.A., F.R.S. p. 91.

probability that magnetism, in the dynamic state, either when the magnet is in motion, or, when the magnetic intensity is varying, will also directly produce chemical affinity, and light, *though, up to the present time, such has not been proved to be the case;* the reciprocal effect, also, of the direct production of magnetism by light, and heat, has not yet been experimentally established."[1]

"When two dissimilar metals in contact are immersed in a liquid belonging to a certain class, and capable of acting chemically on one of them, what is called a voltaic current is formed, and, by the chemical action, that peculiar mode of force called an electric current is generated, which circulates from metal to metal, across the liquid through, the points of contact."[2]

Voltaic electricity, probably, is in a more near relation to heat than magnetism; it being inseparable from heat, and heat from it, and upon the agency of heat consists much of its physical force, attributes, and character. Professor Liebig considers the action of heat similar to that of mechanical force.

Thus, magnetism and electricity are essential, to explain, and may be considered the primary elements of the physical forces, namely, of gravitation, heat, motion, light, chemical action, and mechanical force.

Grove, in his lecture, as also does Liebig, considers, or assumes, motion to be the basis of all physical forces, or to be the cause of them all; namely, heat, motion, gravitation, electricity, and magnetism, each of the above forming different manifestations only, or modes of the development of motion.

He says, upon this point,—"Physical science treats of Matter, and what I shall to-night term its *Affections:* namely, Attraction, Motion, Heat, Light, Electricity, Magnetism, Chemical Affinity. When these react upon matter they constitute *Forces.* The present tendency of theory seems to lead to the opinion that all these affections are

[1] Grove, 'Corr. Phys. Forces,' pp. 75-6.
[2] Ibid., 77.

resolvable into one, namely, Motion; however, should the theories on these subjects be ultimately so effectually generalised as to become laws, they cannot avoid the necessity for retaining different names for these different Affections; or, as they would be called, different modes of Motion.

"To the sciences which treat of these various material forces, are given the various titles of Mechanics, Pneumatics, Optics, Electricity, Magnetism, Chemistry, Chrystallography, Meteorology, and Astronomy."[1]

Mr. Forbes says,—"The recent discovery of Mr. Faraday has conclusively demonstrated that, in every case when a *magnetic current* is created (to use the word *current* in its ordinary acceptation, as indicative of a peculiar condition, and without reference to any theory whatever), a momentary electric current is induced at right angles to it."[2]

Quotations from Sir M. Faraday's 'Experimental Researches on Electricity,' Third Series.

Sir M. Faraday says,[3]—"1. The power which electricity of tension possesses of causing an opposite electrical state in its vicinity, has been expressed by the general term Induction; *which, as it has been received into scientific language, may also with propriety be used in the same general sense to express the power which electrical currents may possess of inducing any particular state upon matter in their immediate neighbourhood, otherwise indifferent.* It is with this meaning that I purpose using it in the present paper.

"2. Certain effects of the induction of electrical currents

[1] 'A Lecture on the Progress of Physical Science since the opening of the London Institution,' by W. R. Grove, Esq., M.A., F.R.S., p. 6.

[2] *Vide* 'Lond. and Edinb. Phil. Ph. J. and M.,' v. i, p. 49; James D. Forbes, F.R.S., &c.

[3] 'On the Induction of Electric Currents,' p. 1; 'Researches on Electricity,' by Sir M. Faraday, &c.

have already been recognised and described, as those of magnetization; Ampere's experiments of bringing a copper disc near to a flat spiral; his repetition with electro-magnets of Arago's extraordinary experiments, and perhaps a few others. Still it appeared unlikely that these could be *all* the effects induction by currents could produce; especially as upon dispensing with iron, almost the whole of them disappear, whilst yet an infinity of bodies, exhibiting definite phenomena of induction, with electricity of tension, still remain to be acted upon by the induction of electricity of motion.

"3. Further (whether Ampere's beautiful theory were adopted, or any other, or whatever reservation were mentally made still) it appeared very extraordinary that, as every electric current was accompanied by a corresponding intensity of magnetic action, at right angles to the current, good conductors of electricity, when placed within the sphere of this action, should not have any current induced through them, or some sensible effect produced equivalent in force to such a current.

"4. These considerations, with their consequence,—the hope of obtaining electricity from ordinary magnetism, have stimulated me at various times to investigate experimentally the inductive effect of electric currents. I lately arrived at positive results; and not only had my hopes fulfilled, but obtained a key which appeared to me to open out a full explanation of Arago's magnetic phenomena, and also to discover a new state which may probably have great influence in some of the most important effects of electric cnrrents.

"5. These results I purpose describing, not as they were obtained, but in such a manner as to give the most concise view of the whole."

"The visible effects of electricity of tension, are attractions or repulsions at sensible distances; those of electricity in *motion*, are the evolution of heat, the production of magnetism, chemical decompositions, physiological

changes, and, lastly, the evolution of light in the form of a spark."[1]

Identity of Electricities, '*Researches,*' vol. iii, p. 163.

"267. The various phenomena exhibited by electricity may, for the purposes of comparison, be arranged under two heads; namely, those connected with electricity of tension, and those belonging to electricity in motion. The distinction is taken at present, not as philosophical, but merely as convenient. The effects of electricity of tension, at rest, is either attraction or repulsion, at sensible distances. The effects of electrical currents may be considered as, 1st, Evolution of heat; 2d, Magnetism; 3d, Chemical decomposition; 4th, Physiological phenomena; 5th, Spark. It will be my object to compare electricities from different sources, and especially common and voltaic electricities, by their power of producing these effects."[2]

'*Researches,*' vol. iii, p. 357.

"360. The general conclusions which must, I think, be drawn from this collection of facts is, that *electricity, whatever may be its source, is identical in its nature.* The phenomena in the five kinds or species quoted, differ not in their character, but only in degree; and in that respect, vary in proportion to the variable circumstances of quantity and intensity, which can at pleasure be made to change in almost any one of the kinds of electricity, as much as it does between one kind and another."

The author then proceeds to examine the electrical phenomena elicited by magneto-electricity, and shows that, as far as they have been observed, they coincide with those of voltaic electricity, and consequently are referable to the same agency. *The only effects that have not yet been obtained are chemical decompositions.*[3]

[1] 'Lond. and Edinb. Phil. Mag. and Journ. of Science,' v. iii, p. 38.

[2] Ibid., p. 460.

[3] Ibid., p. 40.

"366. Hence it would appear that if the same quantity of electricity pass through the galvanometer, *whatever may be* its intensity, the deflecting force upon the magnetic needle is the same."[1]

"377. It also follows that, for this case of electro-chemical decomposition, and it is probable for all cases, that the *chemical power, like the magnetic force* (366), *is in direct proportion to the absolute quantity of electricity which passes.*

"378. Hence arises still further confirmation, if any were required, of the identity of common and voltaic electricity, and that the differences of intensity and quantity are quite sufficient to account for what were supposed to be their distinctive qualities."[2]

The 'Lond. and Ed. Phil. Mag. and Journ. of Science,' treats of Faraday's Discoveries as follows, in vol. iv, p. 293 :—

"The second section contains an account of a new instrument, devised by the author, for exactly measuring electric currents, and which he terms the *volta-electrometer.* The current to be measured is made to pass through water acidulated by sulphuric acid, and the gases evolved by its decomposition are collected and measured, thereby giving at once an expression of the quantity of electricity which has passed. The principle on which this conclusion is founded is the new law discovered by the author, '*that the decomposing action of any current of electricity is constant for a constant quantity of electricity ;*' . . . . . and a given quantity of electricity, whether passed in one or many portions invariably decomposed the same quantity of water. No doubt, therefore, remains as to the truth of the principle on which the volta-electrometer acts."

Page 292, vol. iv, as follows:

". . . . . As a substitute for the term pole, and with

[1] 'Lond. and Edinb. Phil. Mag. and Journ. of Science,' v. iii, p. 362; Faraday's 'Experimental Researches on Electricity.'

[2] Ibid., p. 366.

a view to express also a part of the voltaic apparatus to which that name has never been applied, although it be identical with a pole in its relation to the current, the author proposes to employ the term *electrode*. The surfaces of the decomposing body, at which the positive current of electricity enters and passes out, are denominated respectively the *eisode* and the *exode*.

"Bodies which are decomposable by the electric current are called *electrolytes;* and when *electro-chemically decomposed*, they are said to be *electrolyzed;* the substances themselves which are evolved in such cases being called *zetodes*, and the terms *zeteisode*, and *zetexode* being applied, accordingly as the substances pass in one direction or the other."[1]

"I have made many endeavours to effect chemical decomposition by *magneto-electricity*, but unavailingly . . . . as magneto-electricity can produce sparks," &c.

The instruments used to interpret the laws, and manifestations of physical science, are on many occasions the sources of error, as they are frequently of unexpected truths and discoveries, and both error and truth, may be elicited at the same time; in seeking a principle we may not find it; in the desire or attempt to establish a proposition we may lose it entirely, or we may, on the other hand, discover error, but which at the same moment may enunciate a new and permanent law.

Grove says, "I have now gone through the affections for which distinct names have been given in our received nomenclature, (namely, heat, light, electricity, magnetism chemical affinity, and motion,) that other forces may be discovered, differing as much from these as these differ from each other, is highly probable, and that when discovered, and their modes of action fully traced out, they will be found to be related *inter se*, and to these as they are to each other, I believe to be as far certain as certainty can be predicted of any future event."[2]

[1] Ibid., p. 294.

[2] Grove, p. 90.

"Magnetism and electricity were believed by the highest authorities to stand in relation to cause and effect, *i. e.*, electricity was regarded as the cause, and magnetism as the effect; and where magnets existed without any apparent electrical current to cause their magnetism, *hypothetical currents* were supposed for the purpose of carrying out the causative view; but magnetism may now be said with equal truth to be the cause of electricity, and electrical currents may be referred to hypothetical magnetic lines; again, if electricity causes magnetism, and magnetism causes electricity, why then electricity causes electricity, which becomes, so to speak, a *reductio ad absurdum* of the doctrine." This countenances the view adopted in this essay, which has been alluded to, namely, that electricity and magnetism "were one and the same thing," that is, in their original state of *tension* they are not only correlative, but identical, yet not inseparable, since their separability becomes quickly manifested by magnetism passing off, as a distinct element at right angles, and no "*reductio ad absurdum*" consequently occurs, since thenceforth they become the representative forces of two different and *antagonist* principles, namely, one, *magnetism* (the principle of aggregation, cohesion, and *gravitation*), and the other electricity, (the principle of *segregation* and motion.)

"Magnetism, as was proved by the important discovery of Faraday, will produce electricity, but with this peculiarity —that in itself it is *static;* and, therefore, to produce a dynamic force, motion must be superadded to it; it is, in fact, directive and not motive, altering the direction of other forces, but not in strictness initiating them. *It is difficult to convey a definite notion of the force of magnetism, and of the mode in which it affects other forces, &c., &c.*"[1]

Electricity proceeds to its destination, which is motion, but to arrive at it, it must part with magnetism, which is antagonistic of motion and heat; and as electricity is no sooner moved than this occurs, and magnetism rapidly passes off

[1] Op. cit., p. 65.

through the influence of polarity at right angles from the current, and leaves electricity, which passes on to its proper destination; namely, *motion, voltaic electricity, heat, chemical action, &c.* Thus, as we have aimed to enforce, magnetism may be considered as the principle of aggregation, and cohesion, of homogeneity and rest; and electricity of segregation, namely, of heat and motion; the first represents "a static balanced force," the second heterogeneity, or so-called dynamical force. "Nature gives us a remarkable difference in the character, or mode of the force eliminated by friction, accordingly as the bodies that impinge are homogeneous, or heterogeneous; if the former, heat alone is produced; if the latter, electricity. We find, indeed, instances given by authors of electricity resulting from the friction of homogeneous bodies; but, as I stated in my original lectures, I have not found such facts confirmed by my own experiments."[1]

All conditions of vitality, are more or less motive or dynamical. Thus heat is one of the invariable concomitants of life, as it is also of electricity. Static electricity, *i. e.* electricity of tension retains, or has not yet parted with magnetism, voltaic electricity, or electricity of motion, has sent off magnetism, perhaps through the influence of polarization, and thus dynamical electricity is obtained; particularly as manifested in the voltaic current.

Grove says, "To many of the cases we have been considering, the term 'correlation' may be applied in a more strict accordance with its original sense; thus, with regard to the forces of electricity and magnetism in a dynamic state, we cannot electrize a substance without magnetizing it,—we cannot magnetize it without electrizing it,—each molecule, the instant it is affected by one of these forces, is affected by the other; but, in transverse directions, the forces are inseparable, and mutually dependent—correlative, but not identical."[2]

[1] Ibid., p. 20. [2] Op. cit., p. 96.

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ERRATA.

Page 77, line 7, from the bottom, read *contemporaneous* for *extemporaneous*.
„ 82, „ 8, from the bottom, dele *and*, the last word but one in the line.
„ 107, „ 5, from the top, read for *irresponsibility*, *responsibility*.
„ 112, „ 8, from the bottom, read *Sir Matthew Hale*, for *Lord Hale*.
„ 130, „ 13, from the bottom, read *male*, for *males*.
„ 156, „ 8, from the top, read *Sir Matthew Hale*, for *Lord Hale*.
„ 164, „ 14, from the top, read *cures*, for *cure*.
„ 165, „ 11, from the bottom, read *during* before the word *which*.
„ 172, „ 4, from the bottom, read *neurine*, for *neusine*.
„ 187, „ 12, from the bottom, read *electrolysis*, for *oxanthesis*.
„ 191, „ 2, from the bottom, read *salubrity*, for *salubricity*.
„ 208, „ 14, from the fop, read *assume*, for *assumes*.

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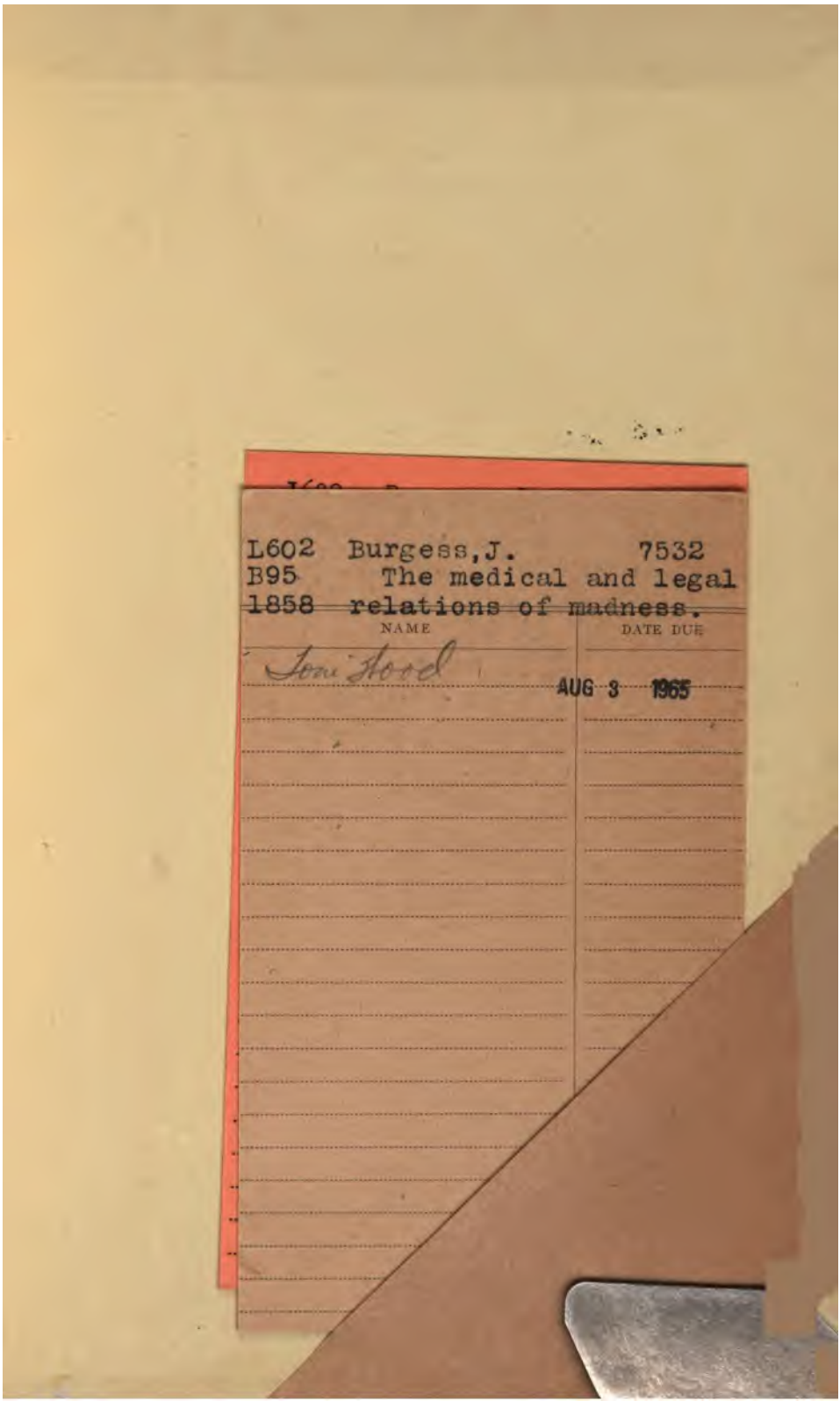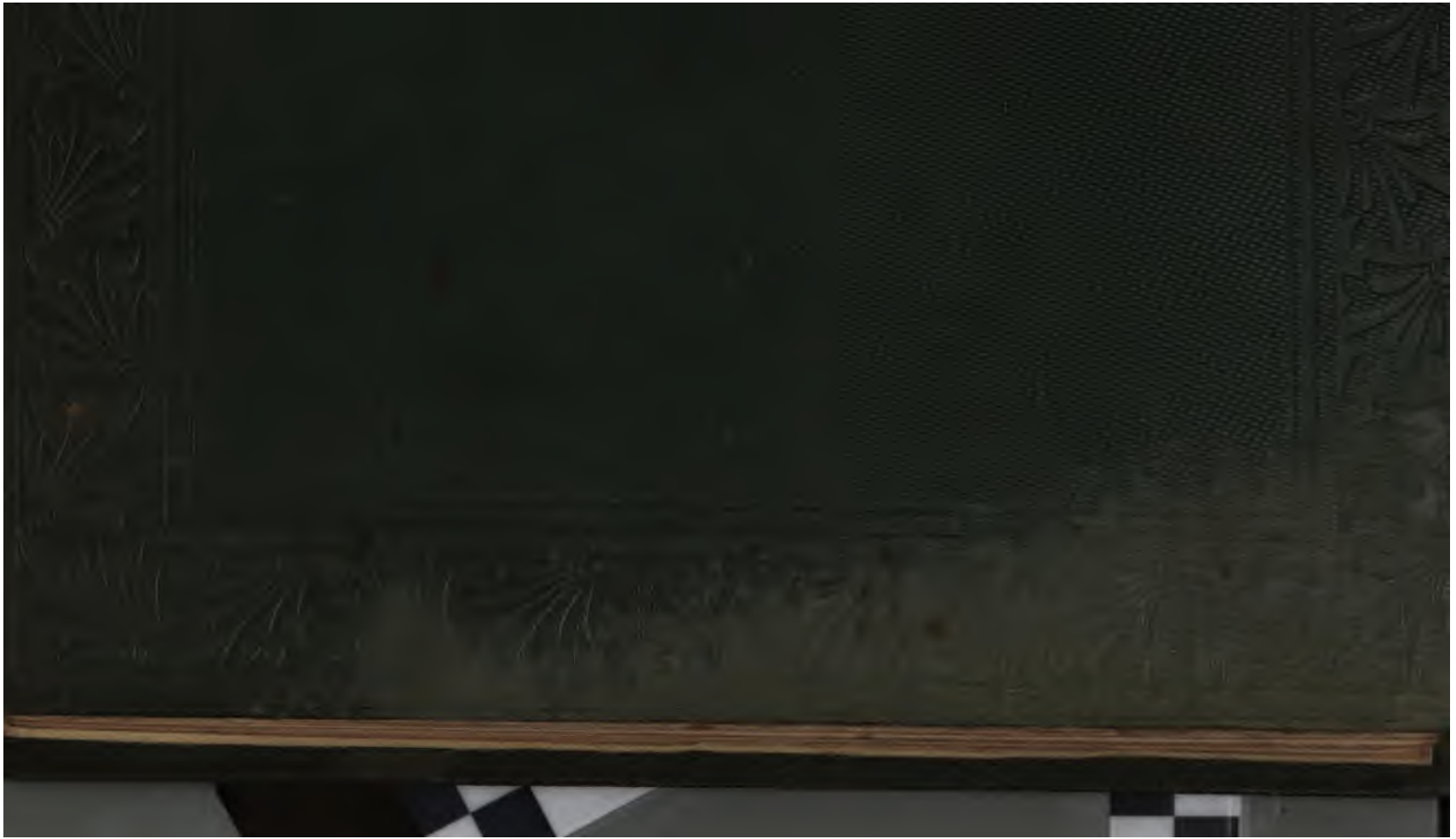
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